

# ecodan

## CYLINDER UNIT

### EHST20 series

### EHPT20 series

#### INSTALLATION MANUAL

**FOR INSTALLER**

For safe and correct use, read this manual and the outdoor unit installation manual thoroughly before installing the cylinder unit. English is the original language. The other languages versions are translation of the original.

#### INSTALLATIONSHANDBUCH

**FÜR INSTALLATEURE**

Aus Sicherheitsgründen und zur richtigen Verwendung vor der Installation des Hydraulikmoduls inkl. Speicher die vorliegende Bedienungsanleitung und die Installationsanleitung der Außeneinheit gründlich durchlesen. Die Originalsprache ist Englisch. Die anderen Sprachversionen sind vom Original übersetzt.

#### MANUEL D'INSTALLATION

**POUR L'INSTALLATEUR**

Pour une utilisation correcte et sûre, lisez soigneusement ce manuel et le manuel d'installation de l'unité extérieure avant d'installer l'ECODAN hydrobox duo. L'anglais est la langue originale. Les versions fournies dans d'autres langues sont des traductions de l'original.

#### INSTALLATIEHANDLEIDING

**VOOR DE INSTALLATEUR**

Lees voor een veilig en juist gebruik deze handleiding en de installatiehandleiding van de buiten-unit aandachtig door voordat u met de installatie van de cilinder begint. Engels is de oorspronkelijke taal. De andere taalversies zijn vertalingen van het origineel.

#### MANUAL DE INSTALACIÓN

**PARA EL INSTALADOR**

Para un uso correcto y seguro, lea detalladamente este manual y el manual de instalación de la unidad exterior antes de instalar el hydrobox duo. El idioma original del documento es el inglés. Las versiones en los demás idiomas son traducciones del original.

#### MANUALE DI INSTALLAZIONE

**PER L'INSTALLATORE**

Per un utilizzo sicuro e corretto, prima di installare l'hydrotank leggere attentamente questo manuale e quello di installazione dell'unità esterna. Il testo originale è redatto in lingua inglese. Le altre versioni linguistiche rappresentano traduzioni dell'originale.

#### MANUAL DE INSTALAÇÃO

**PARA O INSTALADOR**

Para uma utilização segura e correcta, leia este manual e o manual de instalação da unidade exterior antes de instalar o cilindro. O idioma original é o inglês. As versões em outros idiomas são traduções do idioma original.

#### INSTALLATIONSMANUAL

**TIL INSTALLATØREN**

Af hensyn til sikker og korrekt brug skal denne vejledning og vejledningen til udendørsenheden installation læses omhyggeligt, inden tank modulet (unit) installeres. Engelsk er det oprindelige sprog. De andre sprogversioner er oversættelser af originalen.

#### INSTALLATIONSMANUAL

**FÖR INSTALLATÖREN**

För säker och korrekt användning, läs denna manual och utomhusenhetens installationsmanual innan du installerar cylindertanken. Engelska är originalspråket. De övriga språkversionerna är översättningar av originalet.

#### INSTALLERINGSHÅNDBOK

**FOR MONTØREN**

For å sikre en trygg og riktig bruk skal du lese denne håndboken og installeringshåndboken for utendørsenheten grundig før du monterer sylinderenheten. Engelsk er originalspråket. De andre språkversjonene er oversettelser av originalen.

#### ASENNUSOPAS

**ASENTAJALLE**

Lue turvallista ja asianmukaista käyttöä varten tämä opas ja ulkoyksikkö asennusopas huolellisesti ennen varaajyksikön asentamista. Alkuperäiskieli on englanti. Muut kieliversiot ovat alkuperäisen käännöksiä.

English (GB)

Deutsch (D)

Français (F)

Nederlands (NL)

Español (E)

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Dansk (DE)

Svenska (SW)

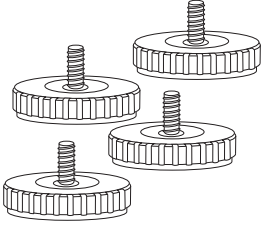
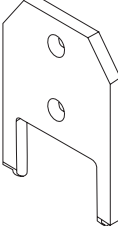
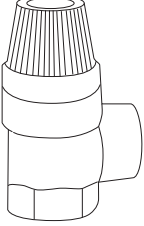
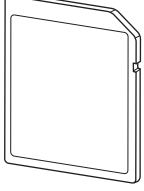
Norsk (NO)

Suomi (FI)

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Accessories (Included)			
Adjustable feet	Immersion heater boss tool EH*T20*-M*HB model only	Pressure relief valve (10 bar) Except EHPT20X-VM2HB	SD memory card
			
4	1	1	1

## Abbreviations and glossary

No.	Abbreviations/Word	Description
1	Compensation curve mode	Space heating incorporating outdoor ambient temperature compensation
2	COP	Coefficient of Performance the efficiency of the heat pump
3	Cylinder unit	Indoor unvented DHW tank and component plumbing parts
4	DHW mode	Domestic hot water heating mode for showers, sinks, etc
5	Flow rate	Speed at which water circulates around the primary circuit
6	Flow temperature	Temperature at which water is delivered to the primary circuit
7	Freeze stat. function	Heating control routine to prevent water pipes freezing
8	FTC4	Flow temperature controller, the circuit board in charge of controlling the system
9	Heating mode	Space heating through radiators or Underfloor heating (Refer to Item no. 18 in this list.)
10	Legionella	Bacteria potentially found in plumbing, showers and water tanks that may cause Legionnaires disease
11	LP mode	Legionella prevention mode – a function on systems with water tanks to prevent the growth of legionella bacterium
12	Packaged model	Plate heat exchanger in the outdoor heat pump unit
13	PRV	Pressure relief valve
14	Refrigerant	A compound used within the heat pump cycle that goes through a phase change from gas to liquid
15	Return temperature	Temperature at which water is delivered from the primary circuit
16	Split model	Plate heat exchanger in the indoor unit
17	TRV	Thermostatic radiator valve – a valve on the entrance or exit of the radiator panel to control the heat output
18	Underfloor heating	A system of water carrying pipes under the floor, that warms the floor surface to heat the room/space.

# 1 Safety Notices

Please read the following safety precautions carefully.

**⚠ WARNING:**  
Precautions that must be observed to prevent injuries or death.

**⚠ CAUTION:**  
Precautions that must be observed to prevent damage to unit.

**This installation manual along with the user manual should be left with the product after installation for future reference.**  
**Mitsubishi Electric is not responsible for the failure of locally-supplied and field-supplied parts.**

- Be sure to perform periodical maintenance.
- Be sure to follow your local regulations.
- Be sure to follow the instructions provided in this manual.

## ⚠ WARNING

### Mechanical

- The cylinder unit and outdoor unit must not be installed, disassembled, relocated, altered or repaired by the user. Ask an authorised installer or technician. If the unit is installed improperly or modified after installation by the user water leakage, electric shock or fire may result.
- The outdoor unit should be securely fixed to a hard level surface capable of bearing its weight.
- The cylinder unit should be positioned on a hard level surface capable of supporting its filled weight to prevent excessive sound or vibration.
- Do not position furniture or electrical appliances below the outdoor unit or cylinder unit.
- The discharge pipework from the emergency devices of the cylinder unit should be installed according to local law.
- Only use accessories and replacement parts authorised by Mitsubishi Electric ask a qualified technician to fit the parts.

### Electrical

- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The units must be powered by a dedicated power supply and the correct voltage and circuit breakers must be used.
- Wiring should be in accordance with national wiring regulations. Connections must be made securely and without tension on the terminals.
- Earth unit correctly.

### General

- Keep children and pets away from both the cylinder unit and outdoor unit.
- Do not use the hot water produced by the heat pump directly for drinking or cooking. This could cause illness to the user.
- Do not stand on the units.
- Do not touch switches with wet hands.
- Annual maintenance checks on both the cylinder unit and the outdoor unit should be done by qualified person.
- Do not place containers with liquids in on top of the cylinder unit. If they leak or spill onto the cylinder unit damage to the unit and/or fire could occur.
- Do not place any heavy items on top of the cylinder unit.
- When installing or relocating, or servicing the cylinder unit, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
- The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- In heating mode, to avoid the heat emitters being damaged by excessively hot water, set the target flow temperature to a minimum of 2°C below the maximum allowable temperature of all the heat emitters. For Zone2, set the target flow temperature to a minimum of 5°C below the maximum allowable flow temperature of all the heat emitters in Zone2 circuit.

## ⚠ CAUTION

- Use clean water that meets local quality standards on the primary circuit.
- The outdoor unit should be installed in an area with sufficient airflow according to the diagrams in the outdoor unit installation manual.
- The cylinder unit should be located inside to minimise heat loss.
- Water pipe-runs on the primary circuit between outdoor and indoor unit should be kept to a minimum to reduce heat loss.
- Ensure condensate from outdoor unit is piped away from the base to avoid puddles of water.
- Remove as much air as possible from the primary and DHW circuits.
- Refrigerant leakage may cause suffocation. Provide ventilation in accordance with EN378-1.
- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Never put batteries in your mouth for any reason to avoid accidental ingestion.
- Battery ingestion may cause choking and/or poisoning.
- Install the unit on a rigid structure to prevent excessive sound or vibration during operation.
- Do not transport the cylinder unit with water inside the DHW tank or coil. This could cause damage to the unit.
- If power to the cylinder unit is to be turned off (or system switched off) for a long time, the water should be drained.
- If unused for a long period, before operation is resumed, DHW tank should be flushed through with potable water.
- Preventative measures should be taken against water hammer, such as installing a Water Hammer Arrestor on the primary water circuit, as directed by the manufacturer.

As for the handling of refrigerant, refer to the outdoor unit installation manual.

# 2 Introduction

The purpose of this installation manual is to instruct competent persons how to safely and efficiently install and commission the cylinder unit system. The target readers of this manual are competent plumbers and/or refrigeration engineers

who have attended and passed the requisite Mitsubishi Electric product training and have appropriate qualifications for installation of an unvented hot water cylinder unit specific to their country.

# 3 Technical Information

## Product specification

GB

Model name	EHST20C-VM6HB	EHST20C-TM9HB	EHST20C-VM6EB	EHST20C-VM9EB	EHST20C-VM2B	EHST20C-VM6B	EHST20C-VM9B	EHST20C-VM6SB	EHST20C-VM2HB	EHPT20X-VM6HB	EHPT20X-VM9HB	EHPT20X-TM9HB	EHPT20X-VM6EB	EHPT20X-VM9EB	EHPT20X-VM6B	EHPT20X-VM9B
Nominal domestic hot water volume	200L															
Overall unit dimensions	1600 x 595 x 680 mm (Height x Width x Depth)															
Weight (empty)	128 kg	128 kg	125 kg	127 kg	127 kg	122 kg	122 kg	128 kg	113 kg	115 kg	115 kg	115 kg	114 kg	114 kg	114 kg	114 kg
Weight (full)	343 kg	343 kg	340 kg	342 kg	342 kg	337 kg	337 kg	343 kg	326 kg	328 kg	328 kg	328 kg	327 kg	327 kg	327 kg	327 kg
Plate heat exchanger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unvented expansion vessel (Primary heating)	12 L															
Safety device	1 bar															
Water circuit (Primary)	1 - 80°C															
Control thermistor	0.3 MPa (3 bar)															
Pressure relief valve	Min flow 5.5 l/min															
Flow switch	90°C															
Manual reset thermostat	121°C															
Thermal Cut-out (for dry run prevention)	40 - 70°C															
Control thermistor	1.0 MPa (10 bar)															
Temperature and pressure relief valve	1.0 MPa (10 bar)															
Booster heater	1.0 MPa (10 bar)															
DHW tank	1.0 MPa (10 bar)															
Primary circuit circulating Pump	Grundfos UP2M2 25 70 - 180															
Connections	28 mm compression primary circuit/ 22 mm compression DHW circuit/22 mm compression solar thermal (Ancillary heating) circuit															
Refrigerant (R410A)	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm	9.52 mm
Flow temperature	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm	15.88 mm
Room temperature	25 - 60°C															
Ambient *1	—															
Outdoor temperature	10 - 30°C															
Time to raise DHW tank temp 15 - 65°C	—															
Time to reheat 70% of DHW tank to 65°C	21.75 mins															
Control board	16 mins															
Booster heater	~N, 230 V, 50 Hz															
Power supply (Phase, voltage, frequency)	10 A															
Breaker (* when powered from independent source)	—															
Power supply (Phase, voltage, frequency)	~N, 230 V, 50 Hz	3-, 400 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz	~N, 230 V, 50 Hz
Capacity	2 kW+ 4 kW	3 kW+ 6 kW	2 kW	2 kW+ 4 kW	3 kW+ 6 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW	2 kW+ 4 kW
Current	26 A	13 A	9 A	26 A	13 A	26 A	13 A	26 A	13 A	26 A	13 A	26 A	13 A	26 A	13 A	26 A
Breaker	32 A	16 A	16 A	32 A	16 A	32 A	16 A	32 A	16 A	32 A	16 A	32 A	16 A	32 A	16 A	32 A
Immersion heater *3	~N, 230 V, 50 Hz															
Capacity	3 kW															
Current	13 A															
Breaker	16 A															
Solar (ancillary) connection	—															

<Table 3.1>

### Optional extras

- Wireless Remote Controller
- Wireless Receiver
- Immersion heater (1 Ph 3kW)
- EHPT Accessories for UK
- Remote sensor
- Joint pipe (15.88 → 12.7)
- Joint pipe (9.52 → 6.35)
- Thermistor
- High temperature thermistor
- PAC-SE41 TS-E
- PAC-SH50RJE
- PAC-SH30RJE
- PAC-TH011-E
- PAC-TH011HT-E

\*1 The environment must be frost-free.

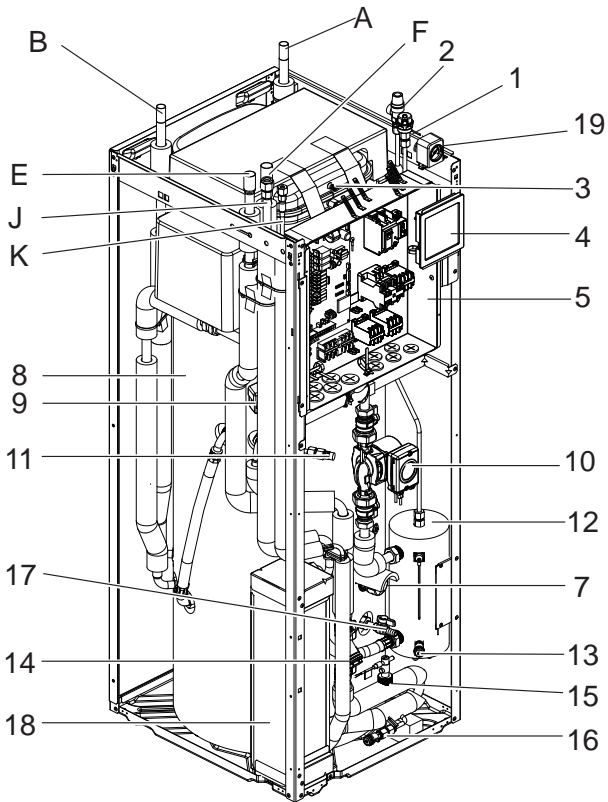
\*2 Tested under BS7206 conditions .

\*3 Do not fit immersion heaters without thermal cut-out.

# 3 Technical Information

## Component Parts

### <EHST20C-\*M\*HB/\*M\*B> (Split model system)



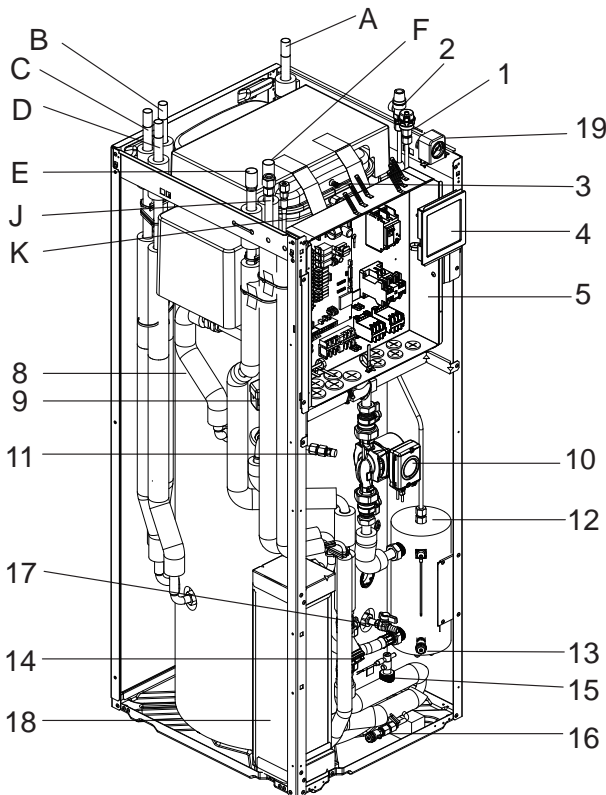
<Figure 3.1>

Number	Component
1	Automatic air vent
2	Pressure relief valve
3	Expansion vessel *(Except EHST20C-*M*EB)
4	Main controller
5	Control and electrical box
7	Immersion heater (Only for EHST20C-*M*HB)
8	DHW tank
9	3-way valve
10	Water circulation pump
11	Manual air vent
12	Booster heater
13	Drain cock (Booster heater)
14	Strainer valve
15	Flow switch
16	Drain cock (Primary circuit)
17	Drain cock (DHW tank)
18	Plate heat exchanger
19	Manometer
A	DHW outlet
B	Cold water inlet
E	Inlet from space heating
F	Outlet to space heating
J	Refrigerant (Gas)
K	Refrigerant (Liquid)

<Table 3.2>

\*For installation of EHST20C-\*M\*EB model, make sure to install a primary-side expansion vessel in the field. (See Figure 4.3.1.)

### <EHST20C-VM6SB> (Solar split model system)



<Figure 3.2>

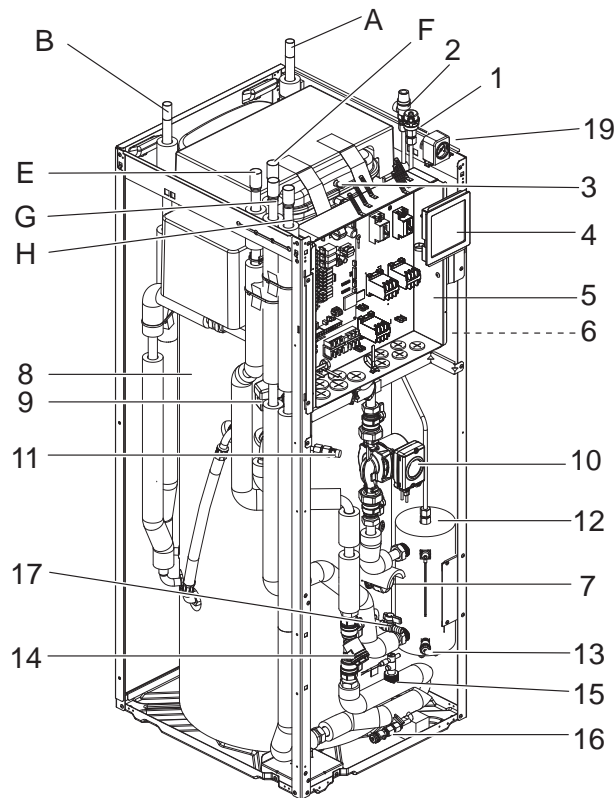
Number	Component
1	Automatic air vent
2	Pressure relief valve
3	Expansion vessel
4	Main controller
5	Control and electrical box
8	DHW tank
9	3-way valve
10	Water circulation pump
11	Manual air vent
12	Booster heater
13	Drain cock (Booster heater)
14	Strainer valve
15	Flow switch
16	Drain cock (Primary circuit)
17	Drain cock (DHW tank)
18	Plate heat exchanger
19	Manometer
A	DHW outlet
B	Cold water inlet
C	Outlet to solar
D	Inlet from solar
E	Inlet from space heating
F	Outlet to space heating
J	Refrigerant (Gas)
K	Refrigerant (Liquid)

<Table 3.3>

GB

### 3 Technical Information

#### <EHPT20X-VM2HB> (UK Packaged model system)

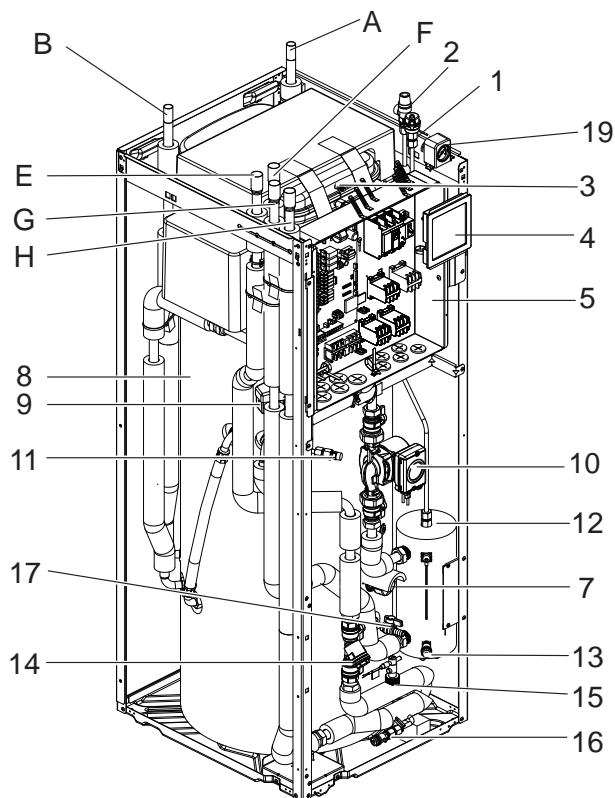


<Figure 3.3>

Number	Component
1	Automatic air vent
2	Pressure relief valve
3	Expansion vessel
4	Main controller
5	Control and electrical box
6	Temperature and pressure relief valve (not visible)
7	Immersion heater
8	DHW tank
9	3-way valve
10	Water circulation pump
11	Manual air vent
12	Booster heater
13	Drain cock (Booster heater)
14	Strainer valve
15	Flow switch
16	Drain cock (Primary circuit)
17	Drain cock (DHW tank)
19	Manometer
A	DHW outlet
B	Cold water inlet
E	Inlet from space heating
F	Outlet to space heating
G	Inlet from heat pump
H	Outlet to heat pump

<Table 3.4>

#### <EHPT20X-\*M\*HB/\*M\*B (except EHPT20X-VM2HB)> (Packaged model system)



<Figure 3.4>

Number	Component
1	Automatic air vent
2	Pressure relief valve
3	Expansion vessel
4	Main controller
5	Control and electrical box
7	Immersion heater (Only for EHPT20X-*M*HB)
8	DHW tank
9	3-way valve
10	Water circulation pump
11	Manual air vent
12	Booster heater
13	Drain cock (Booster heater)
14	Strainer valve
15	Flow switch
16	Drain cock (Primary circuit)
17	Drain cock (DHW tank)
19	Manometer
A	DHW outlet
B	Cold water inlet
E	Inlet from space heating
F	Outlet to space heating
G	Inlet from heat pump
H	Outlet to heat pump

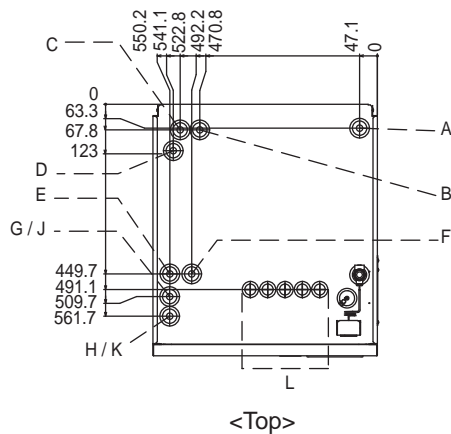
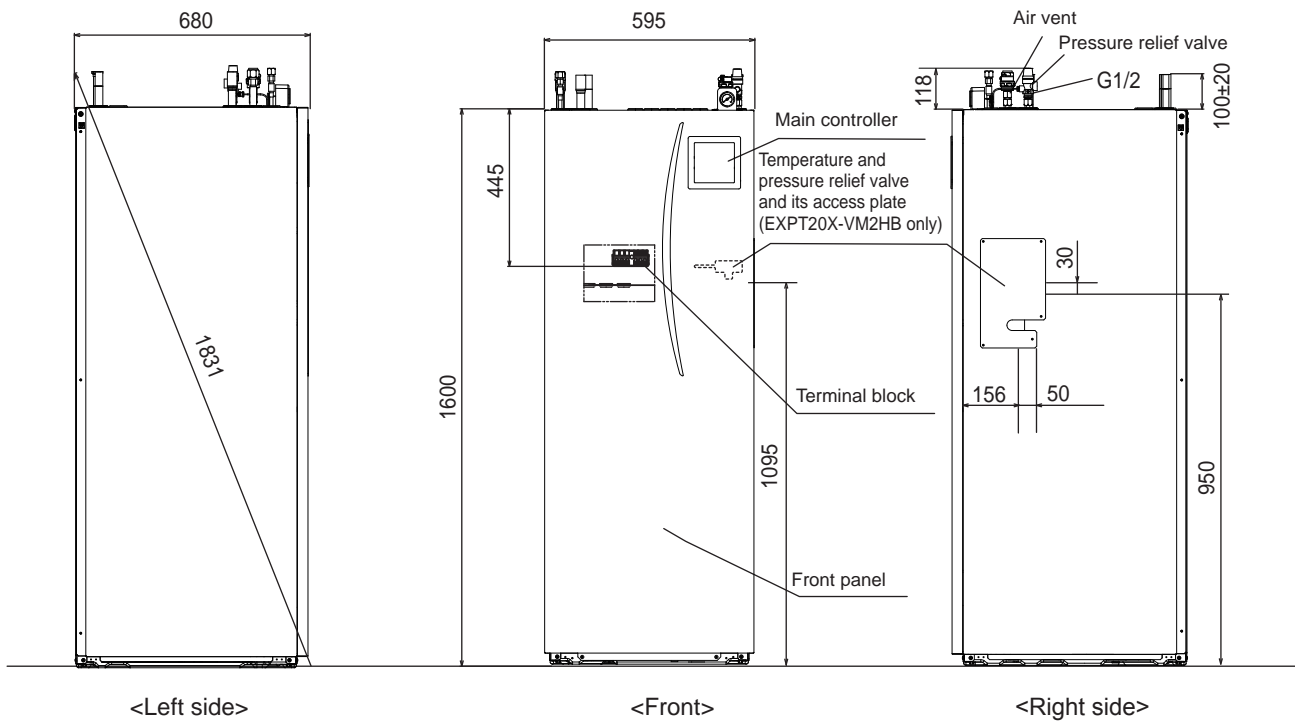
<Table 3.5>



# 3 Technical Information

## Technical Drawings

<Unit: mm>



Letter	Pipe description	Connection size/type
A	DHW outlet connection	22 mm/Compression
B	Cold water inlet connection	22 mm/Compression
C/D	Solar (ancillary heat source) connection	22 mm/Compression
E	Space heating return connection	28 mm/Compression
F	Space heating flow connection	28 mm/Compression
G	Flow from heat pump connection (No plate heat exchanger)	28 mm/Compression
H	Return to heat pump connection (No plate heat exchanger)	28 mm/Compression
J	Refrigerant (GAS) (With plate heat exchanger)	15.88 mm/Flare
K	Refrigerant (LIQUID) (With plate heat exchanger)	9.52 mm/Flare
L	Electrical cable inlets ①②③④⑤ ○ ○ ○ ○ ○	— For inlets ① and ②, run low-voltage wires including external input wires and thermostat wires. For inlets ③, ④, and ⑤, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires. *For a wireless receiver (option) cable, use inlet ①.

<Table 3.6>

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# 3 Technical Information

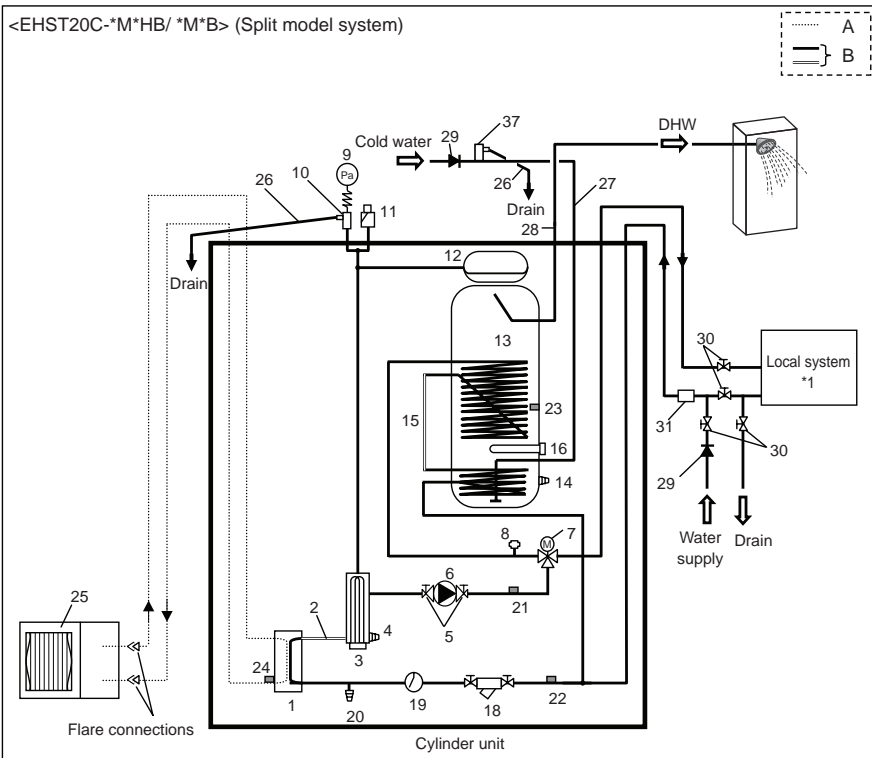
## Unit Compatibility

Outdoor unit	Cylinder unit	EHST20C-VM6HB	EHST20C-YM9HB	EHST20C-TM9HB	EHST20C-VM2B	EHST20C-VM6B	EHST20C-YM9B	EHST20C-VM6EB	EHST20C-YM9EB	EHST20C-VM6SB	EHPT20X-VM2HB	EHPT20X-VM6HB	EHPT20X-YM9HB	EHPT20X-TM9HB	EHPT20X-VM6B	EHPT20X-YM9B
Packaged model	PUHZ-W50-85										✓	✓	✓	✓	✓	✓
	PUHZ-HW112-140															
Split model	PUHZ-RP35-140	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	PUHZ-HRP71-125															
	PUHZ-SW40-120															
	PUHZ-SHW80-140															
	PUHZ-FRP															

<Table 3.7>

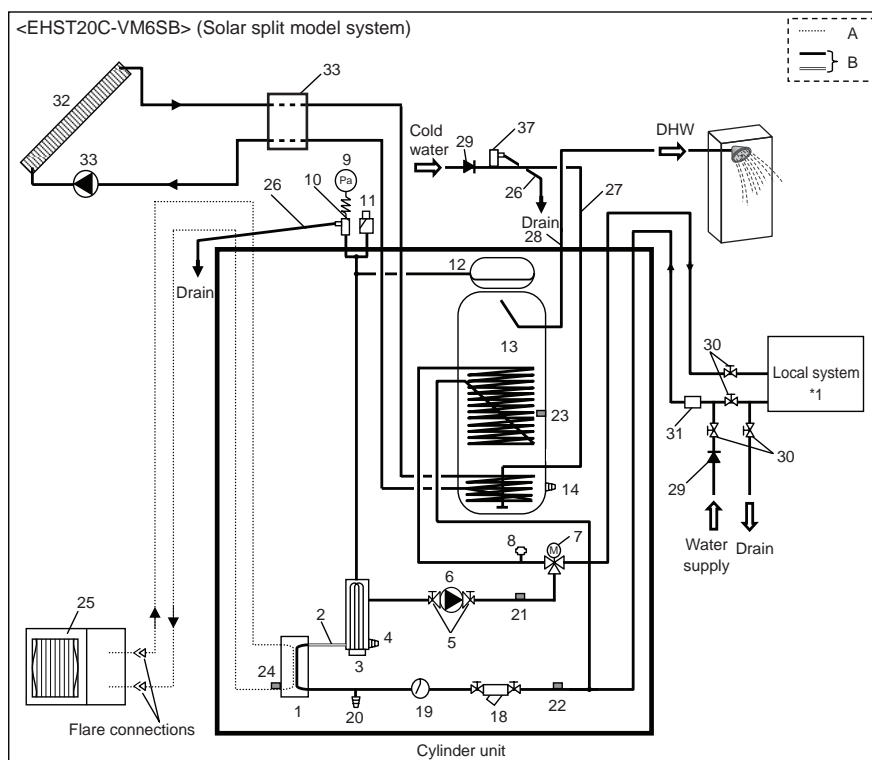
## Water circuit diagram

<EHST20C-\*M\*HB/ \*M\*EB> (Split model system)



<Figure 3.5>

<EHST20C-VM6SB> (Solar split model system)



<Figure 3.6>

- A. Refrigerant pipe
- B. Water pipe
- 1. Plate heat exchanger
- 2. Flexible hose
- 3. Booster heater 1,2
- 4. Drain cock (booster heater)
- 5. Pump valve
- 6. Water circulation pump 1
- 7. 3-way valve
- 8. Manual air vent
- 9. Manometer
- 10. Pressure relief valve (3 bar)
- 11. Automatic air vent
- 12. Expansion vessel (except EHST20C-\*M\*EB)
- 13. DHW tank
- 14. Drain cock (DHW tank)
- 15. Flexible hose
- 16. Immersion heater (only for EHST20C-\*M\*HB)
- 18. Strainer valve
- 19. Flow switch
- 20. Drain cock (primary circuit)
- 21. THW1
- 22. THW2
- 23. THW5
- 24. TH2
- 25. Outdoor unit
- 26. Drain pipe (field supply)
- 27. Cold water inlet pipe
- 28. DHW outlet connection
- 29. Back flow prevention device (field supply)
- 30. Isolating valve (field supply)
- 31. Magnetic filter (field supply) (recommended)
- 32. Solar panel (field supply)
- 33. Solar hydraulic kit (kit to be compatible for use with FTC 4 (field supply)
- 37. Pressure relief valve (10 bar) (accessory)

\*1 Refer to Page 10.

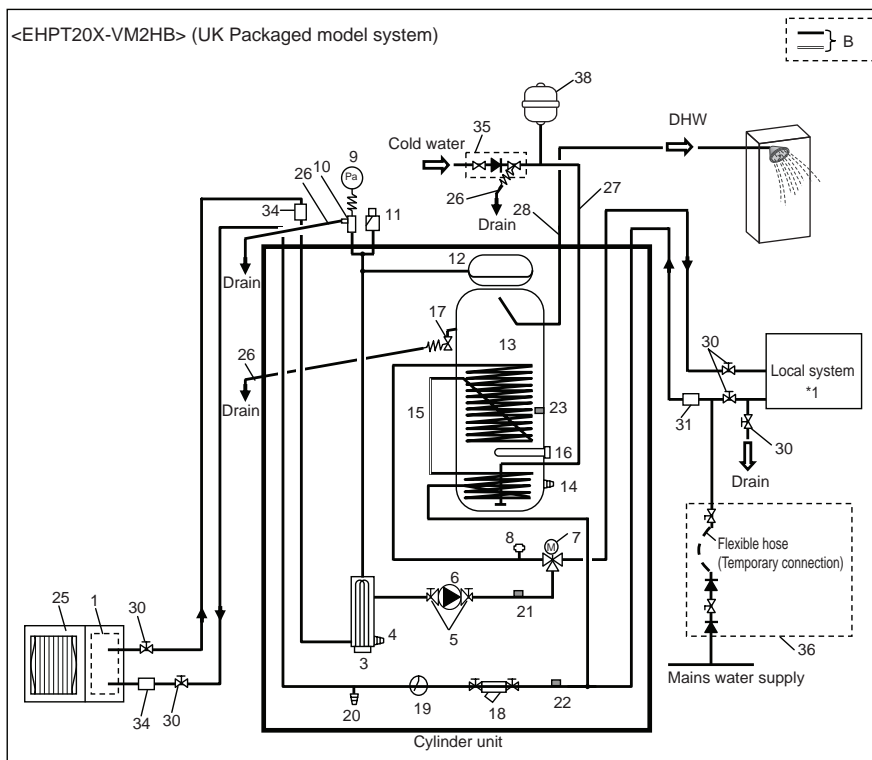
### Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.



### 3 Technical Information

#### UK Packaged model system <Example>



<Figure 3.7>

- B. Water pipe
1. Plate heat exchanger
  3. Booster heater 1,2
  4. Drain cock for booster heater
  5. Pump valve
  6. Water circulation pump 1
  7. 3-way valve
  8. Manual air vent
  9. Manometer
  10. Pressure relief valve
  11. Automatic air vent
  12. Expansion vessel
  13. DHW tank
  14. Drain cock for DHW tank
  15. Flexible hose
  16. Immersion heater (only for EH\*T20\*-M\*HB)
  17. T&P relief valve
  18. Strainer valve
  19. Flow switch
  20. Drain cock for primary circuit
  21. THW1
  22. THW2
  23. THW5
  25. Outdoor unit
  26. Drain pipe (field supply)
  27. Cold water inlet pipe
  28. DHW outlet connection
  30. Isolating valve (field supply)
  31. Magnetic filter (field supply) (recommended)
  34. Strainer (field supply)
  35. Inlet control group supplied with UK model ONLY\*
  36. Filling loop (Ball valves, check valves, and flexible hose) supplied with UK model ONLY\*
  38. Potable expansion vessel supplied with UK model ONLY\*

Model name	EHPT20X-VM2HB
Maximum supply pressure to the pressure reducing valve	16 bar
Operating pressure (Potable side)	3.5 bar
Expansion vessel charge setting pressure (Potable side)	3.5 bar
Expansion valve setting pressure (Potable side)	6.0 bar
Immersion heater specification (Potable side)	
* EN60335/Type 3000W single phase 230V 50Hz, length 460 mm	3000 W, 230 V
** Use only Mitsubishi Electric service parts as a direct replacement.	
DHW tank capacity	200 L
Mass of the unit when full	332 kg
Maximum primary working pressure	2.5 bar

<Table 3.8>

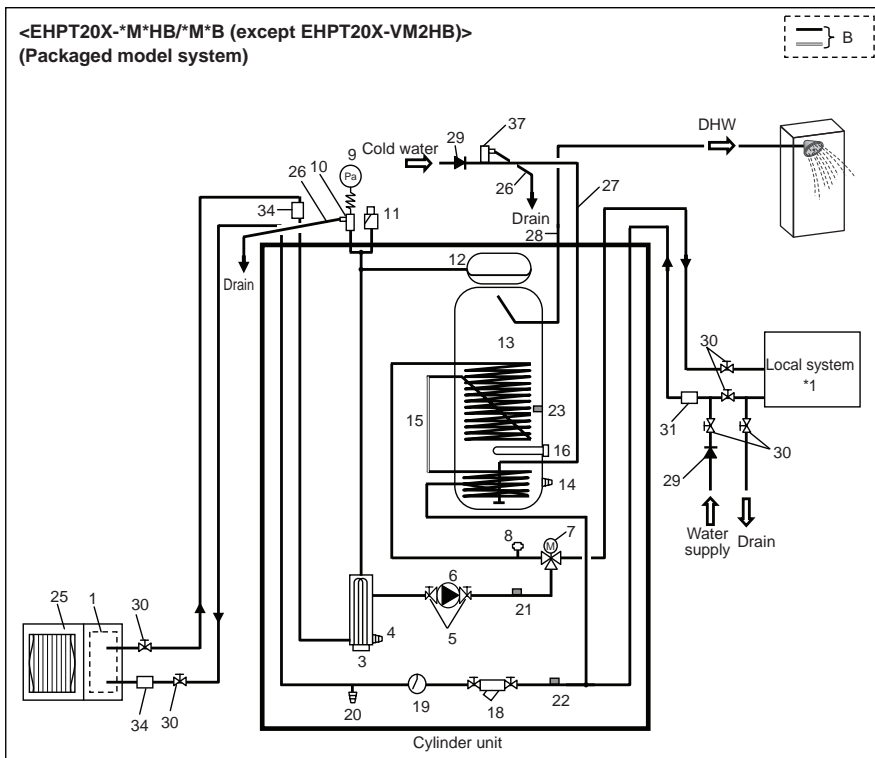
\*Please refer to [PAC-WK01UK-E](#) Installation Manual for more information.

\*1 Refer to Page 10.

#### Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the expansion valve (item 35) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage any pipework.
- Filling loop's flexible hose must be removed following the filling procedure. Item provided with unit as loose accessory.
- Install the inlet control group (item 35) above the level of the T&P relief valve (item 17). This will ensure DHW tank will not require drain-down to service/maintain the inlet control group.

### 3 Technical Information



<Figure 3.8>

- B. Water pipe
1. Plate heat exchanger
  3. Booster heater 1,2
  4. Drain cock for booster heater)
  5. Pump valve
  6. Water circulation pump 1
  7. 3-way valve
  8. Manual air vent
  9. Manometer
  10. Pressure relief valve (3 bar)
  11. Automatic air vent
  12. Expansion vessel
  13. DHW tank
  14. Drain cock for DHW tank
  15. Flexible hose
  16. Immersion heater (only for EH\*T20\*-\*M\*HB)
  18. Strainer valve
  19. Flow switch
  20. Drain cock for primary circuit
  21. THW1
  22. THW2
  23. THW5
  25. Outdoor unit
  26. Drain pipe (field supply)
  27. Cold water inlet pipe
  28. DHW outlet connection
  29. Back flow prevention device (field supply)
  30. Isolating valve (field supply)
  31. Magnetic filter (field supply) (recommended)
  34. Strainer (field supply)
  37. Pressure relief valve (10 bar) (accessory)
- \*1 Refer to Page 10.

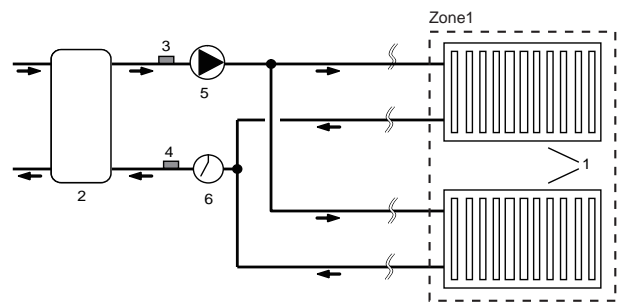
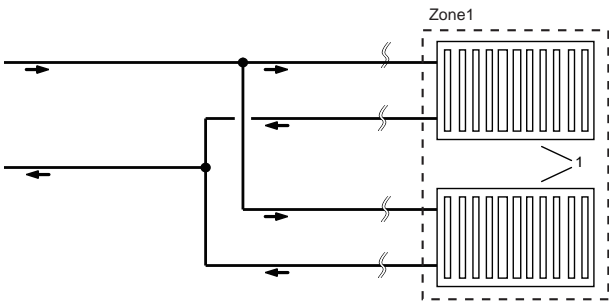
#### Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.)

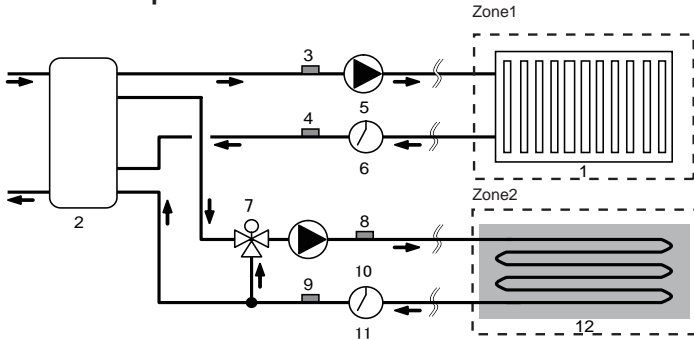
# 3 Technical Information

## Local system

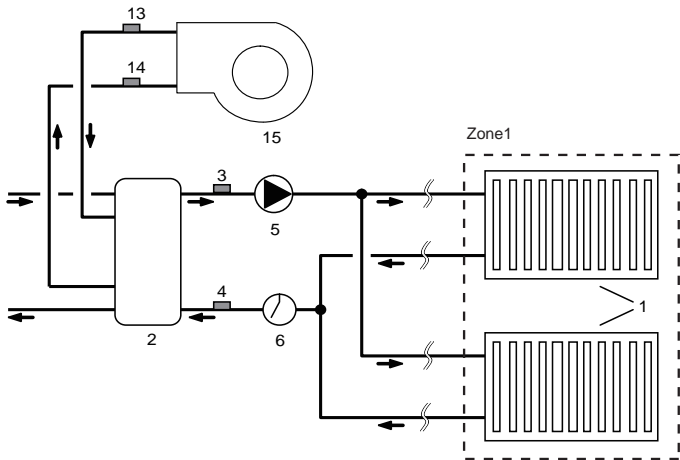
### 1-zone temperature control



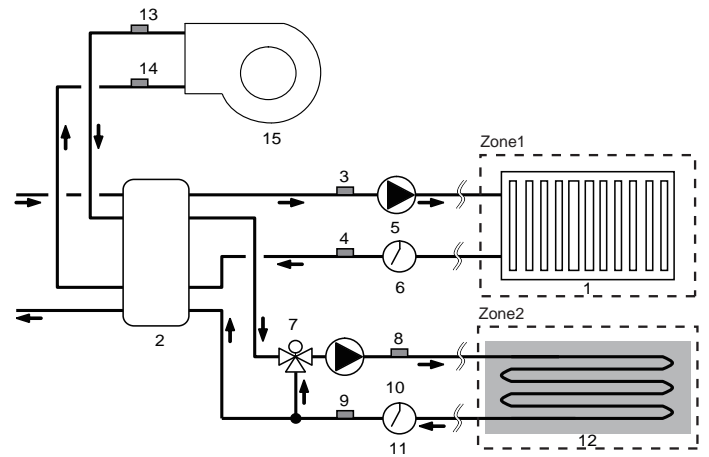
### 2-zone temperature control



### 1-zone temperature control with boiler



### 2-zone temperature control with boiler



1. Zone1 heat emitters (e.g. radiator, fan coil unit) (field supply)
2. Mixing tank (field supply)
3. Zone1 flow water temp. thermistor (THW6)
4. Zone1 return water temp. thermistor (THW7) } Optional part : PAC-TH011-E
5. Zone1 water circulation pump (field supply)
6. Zone1 flow switch (field supply) \*
7. Motorized mixing valve (field supply)
8. Zone2 flow water temp. thermistor (THW8)
9. Zone2 return water temp. thermistor (THW9) } Optional part : PAC-TH011-E
10. Zone2 water circulation pump (field supply)
11. Zone2 flow switch (field supply) \*
12. Zone2 heat emitters (e.g. underfloor heating) (field supply)
13. Boiler flow water temp. thermistor (THWB1)
14. Boiler return water temp. thermistor (THWB2) } Optional part : PAC-TH011HT-E
15. Boiler

\* Flow switch specifications: DC13 V / 0.1 mA / Both normally-open and normally-closed types can be used. (Set Dip switch 3 to select the logics. Refer to "5.1 Dip switch function".)

# 4 Installation

## <Preparation before the installation and service>

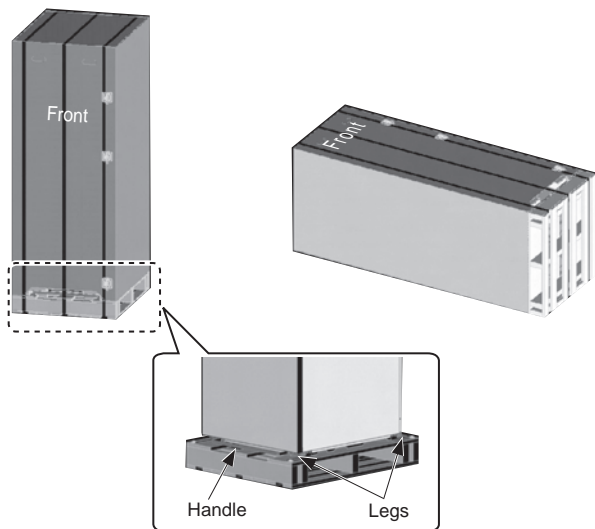
- Prepare the proper tools.
- Prepare the proper protection.
- Allow parts to cool before attempting any maintenance.
- Provide adequate ventilation.
- After stopping the operation of the system, turn off the power-supply breaker and remove the power plug.
- Discharge the capacitor before commencing work involving the electric parts.

## <Precautions during service>

- Do not perform work involving electric parts with wet hands.
- Do not pour water or liquid into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold surfaces in the refrigerant cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch any live parts.

## 4.1 Location

### ■ Transportation and Handling



<Figure 4.1.1>

Cylinder unit is delivered on a wooden pallet base with cardboard protection.

Care should be taken when transporting the cylinder unit that the casing is not damaged by impact. Do not remove the protective packaging until cylinder unit has reached its final location. This will help protect the structure and control panel.

- The cylinder unit can be transported either vertically or horizontally. If transported horizontally the panel marked 'Front' must be facing **UPWARDS** <Figure 4.1.1>.
- The cylinder unit should **ALWAYS** be moved by a minimum of 2 people.
- When carrying the cylinder unit use the handles provided.
- Before using the handles, make sure they are securely attached.
- **Please remove front handle, fixing legs, wooden base and any other packaging once the unit is in installation location.**
- **Keep the handles for future transportation.**

### ■ Suitable Location

Before installation the cylinder unit should be stored in a frost-free weather-proof location. Units must **NOT** be stacked.

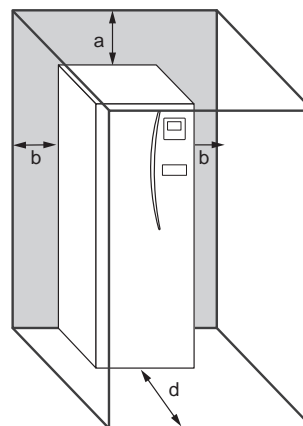
- The cylinder unit should be installed indoors in a frost free weather proof location.
- The cylinder unit should be positioned on a level surface capable of supporting it's filled weight. (Adjustable feet (accessory parts) can be used to ensure unit is level)
- When using the adjustable feet, ensure that the floor is strong enough.
- Care should be taken that minimum distances around and in front of the unit for service access are observed <Figure 4.1.2>.
- Secure the cylinder unit to prevent it being knocked over accidentally or during earthquakes.
- Install the cylinder unit where it is not exposed to water/excessive moisture.

### ■ Service access diagrams

Service access	
Parameter	Dimension (mm)
a	300
b	150
c (distance behind unit not visible in Figure 4.1.2)	10
d	500

<Table 4.1.1>

Sufficient space **MUST** be left for the provision of discharge pipework as detailed in National and Local Building Regulations.



<Figure 4.1.2>

Service access

The cylinder unit must be located indoors and in a frost-free environment, for example in a utility room, to minimise heat loss from stored water.

### ■ Room Thermostat

If fitting a new room thermostat for this system;

- Position it out of direct sunlight and draughts
- Position it away from internal heat sources
- Position it in a room without a TRV on the radiator/heat emitter.
- Position it on an internal wall

**Note: Do not position the thermostat excessively close to the wall. The thermostat may detect the temperature of the wall, which could affect appropriate control of the room temperature.**

- Position it approx. 1.5 m from floor level

### ■ Repositioning

If you need to move the cylinder unit to a new position **FULLY DRAIN** the cylinder unit and the internal coil before moving to avoid damage to the unit.

## 4 Installation

### 4.2 Water Quality and System Preparation

#### ■ General

- Water quality should be to European Directive 98/83 EC standards.
  - pH value of 6.5-8.0 (Recommended: pH6.5 - 7.5)
  - Calcium ≤ 100 mg/l
  - Chlorine ≤ 100 mg/l
  - Iron/Manganese ≤ 0.5 mg/l
- In known hard water areas, to prevent/minimise scaling, it is beneficial to restrict the routine stored water temperature (DHW max. temp.) to 55°C.

#### ■ Anti-Freeze

Anti-freeze solutions MUST use propylene glycol with a toxicity rating of Class 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition.

**Note: Ethylene glycol is toxic and must NOT be used in the primary water circuit in case of any cross-contamination of the potable circuit.**

#### ■ New Installation (primary water circuit)

- Before connecting outdoor unit, thoroughly cleanse pipework of building debris, solder etc using a suitable chemical cleansing agent.
- Flush the system to remove chemical cleanser.
- For all packaged model systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipework and system components.
- For split model systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

#### ■ Existing Installation (primary water circuit)

- Before connecting outdoor unit the existing heating circuit MUST be chemically cleansed to remove existing debris from the heating circuit.
- Flush the system to remove chemical cleanser.
- For all packaged model systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipework and system components.
- For split model systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

When using chemical cleansers and inhibitors always follow manufacturer's instructions and ensure the product is appropriate for the materials used in the water circuit

#### ■ How to access Internal Components and Control and Electrical Box

<A> Opening the front panel

- Remove the two lower screws.
- Slide front panel upwards to slightly and open carefully.
- Disconnect the relay connector connecting main controller cable and the control board cable.

<B> Opening the control and electrical box cover

- Remove the 4 screws.
- Slide the control and electrical box cover upwards slightly and remove facing panel.

<C> Accessing the back of the control and electrical box

- The control and electrical box has 3 holding screws and is hinged on the left hand side.
- Remove the holding screw on the control and electrical box.
  - The control and electrical box can then be swung forward on the left hand hinges.

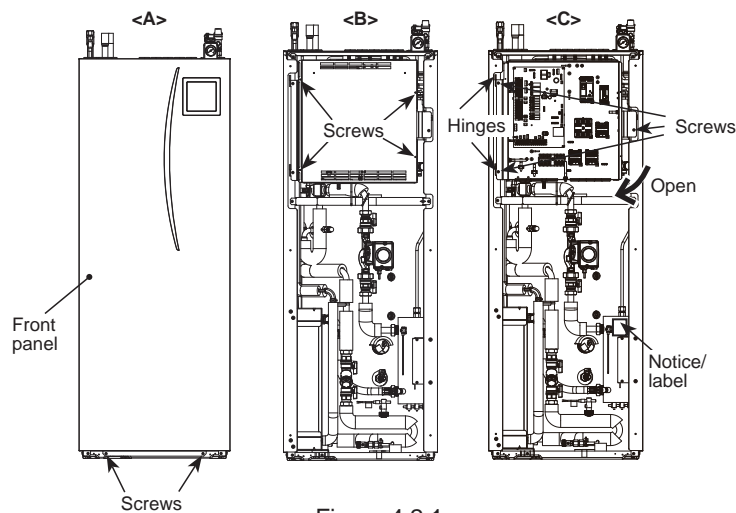
#### Note:

- Before accessing back of control and electrical box release cables from the tie straps attached to the cross-support.
- After servicing, re-secure all cables using straps provided. Reconnect main controller cable to its relay connector. Replace front panel and re-secure screws at base.

#### ■ Minimum amount of water required in the space heating circuit

Outdoor heat pump unit	Minimum water quantity [L]	
Packaged model	PUHZ-W50	40
	PUHZ-W85	60
	PUHZ-HW112	80
	PUHZ-HW140	100
Split model	PUHZ-RP35	32
	PUHZ-RP50	40
	PUHZ-RP60	50
	PUHZ-(H)RP71	60
	PUHZ-(H)RP100	80
	PUHZ-(H)RP125	100
	PUHZ-RP140	120
	PUHZ-SW40	32
	PUHZ-SW50	40
	PUHZ-SW75	60
	PUHZ-SW100	80
	PUHZ-SW120	120
	PUHZ-SHW80	60
	PUHZ-SHW112	80
PUHZ-SHW140	100	

<Table 4.2.1>



<Figure 4.2.1>

# 4 Installation

## 4.3 Water Pipe Work

### Hot Water Pipework

**The cylinder unit is UNVENTED.** When installing unvented hot water systems building regulations part G3 (England and Wales), P3 (Scotland) and P5 (Northern Ireland) should be adhered to. If outside of the UK please adhere to your own country's regulations for unvented hot water systems.

Connect the flow for the DHW to pipe A (Figure 3.1). The function of the following safety components of the cylinder unit should be checked on installation for any abnormalities;

- Pressure relief valve
- Temperature and pressure relief valve (EHPT20X-VM2HB ONLY)
- Expansion vessel pre-charge (gas charge pressure)

The instruction on the following pages regarding safe discharge of hot water from Safety devices should be followed carefully.

- The pipework will become very hot, so should be insulated to prevent burns.
- When connecting pipework, ensure that no foreign objects such as debris or the like do not enter the pipe.

### Cold Water Pipework

Cold water to the suitable standard (see section 4.2) should be introduced to the system by connecting pipe B (Figure 3.1) using appropriate fittings.

### Hydraulic filter work (ONLY EHPT series)

Install a hydraulic filter or strainer (field supply) at the water intake ("Pipe G" in Fig.3.4, Fig.3.5)

### Pipework Connections

Connections to the cylinder unit should be made using the 22 mm or 28 mm compression as appropriate.

Do not over-tighten compression fittings as this will lead to deformation of the olive ring and potential leaks.

**Note: To weld the pipes in the field, cool the pipes on the cylinder unit using wet towel etc.**

### Insulation of Pipework

- All exposed water pipework should be insulated to prevent unnecessary heat loss and condensation. To prevent condensate entering the cylinder unit, the pipework and connections at the top of the cylinder unit should be carefully insulated.
- Cold and hot water pipework should not be run close together where possible, to avoid unwanted heat transfer.
- Pipework between outdoor heat pump unit and cylinder unit should be insulated with suitable pipe insulation material with a thermal conductivity of  $\leq 0.04$  W/m.K.

### Filling the System (Primary Circuit)

Filling

1. Check all connections including factory fitted ones are tight.
2. Insulate pipework between cylinder unit and outdoor unit.
3. Thoroughly clean and flush, system of all debris. (see section 4.2 for instruction.)
4. Fill cylinder unit with potable water. Fill primary heating circuit with water and suitable anti-freeze and inhibitor as necessary. **Always use a filling loop with double check valve when filling the primary circuit to avoid back flow contamination of water supply.**

- Anti-freeze should always be used for packaged model systems (see section 4.2 for instruction). It is the responsibility of the installer to decide if anti-freeze solution should be used in split model systems depending on each site's conditions. Corrosion inhibitor should be used in both split model and packaged model systems.
- When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

5. Check for leakages. If leakage is found, retighten the screws onto the connections.
6. Pressurise system to 1 bar.
7. Release all trapped air using air vents during and following heating period.
8. Top up with water as necessary. (If pressure is below 1 bar)

### Sizing Expansion Vessels

Expansion vessel volume must fit the local system water volume.

To size an expansion vessel for the heating circuit the following formula and graph can be used.

When the necessary expansion vessel volume exceeds the volume of an built-in expansion vessel, install an additional expansion vessel so that the sum of the volumes of the expansion vessels exceeds the necessary expansion vessel volume.

\* For installation of an EHST20C-\*M\*EB model, provide and install an expansion vessel in the field as the model does not come fitted with an expansion vessel.

$$V = \frac{\epsilon \times G}{1 - \frac{P_1 + 0.098}{P_2 + 0.098}}$$

Where;

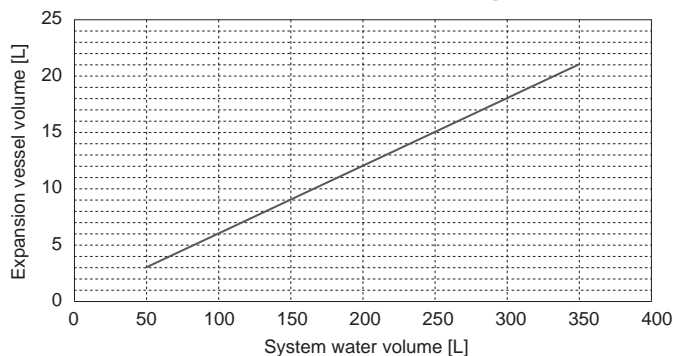
- V : Necessary expansion vessel volume [L]
- $\epsilon$  : Water expansion coefficient
- G : Total volume of water in the system [L]
- P<sub>1</sub> : Expansion vessel setting pressure [MPa]
- P<sub>2</sub> : Max pressure during operation [MPa]

Graph to the right is for the following values

- $\epsilon$  : at 70 °C = 0.0229
- P<sub>1</sub> : 0.1 MPa
- P<sub>2</sub> : 0.3 MPa

\*A 30% safety margin has been added.

Expansion vessel sizing



<Figure 4.3.1>



# 4 Installation

## Water Circulation Pump Characteristics

Pump speed can be selected by main controller setting (see <Figure 4.3.2 to 4.3.5> ).

Adjust the pump speed setting so that the flow rate in the primary circuit is appropriate for the outdoor unit installed (see Table 4.3.1). It may be necessary to add an additional pump to the system depending on the length and lift of the primary circuit.

<Second pump >

If a second pump is required for the installation please read the following carefully.

If a second pump is used in the system it can be positioned in 2 ways.

The position of the pump influences which terminal of the FTC4 the signal cable should be wired to. If the additional pump(s) have current greater than 1A please use appropriate relay. Pump signal cable can either be wired to TBO.1 1-2 or CNP1 but not both.

Option 1 (Space heating only)

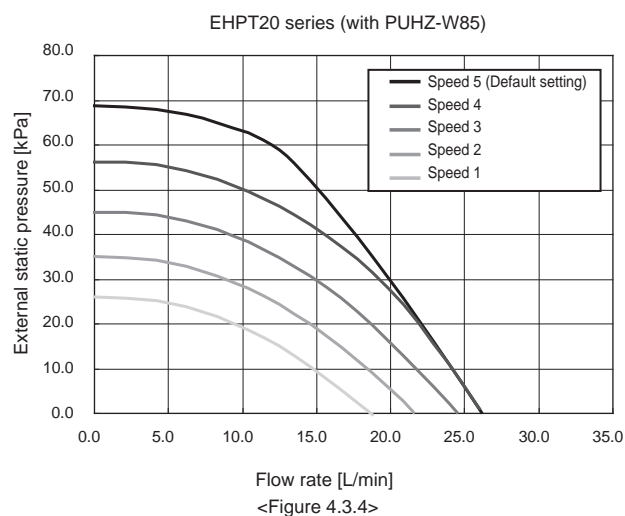
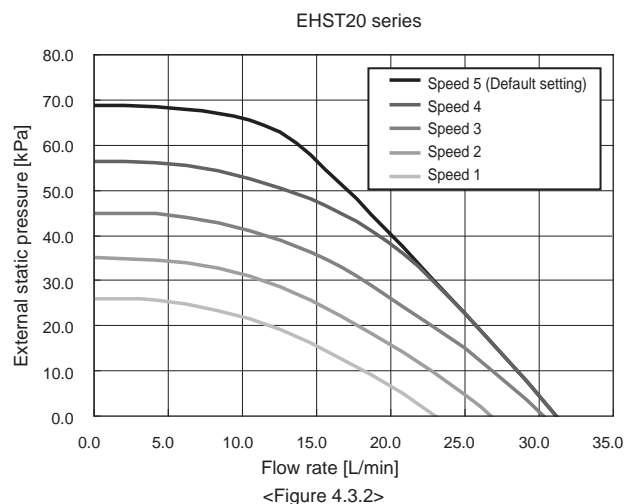
If the second pump is being used for the heating circuit only then the signal cable should be wired to TBO.1 terminals 3 and 4 (OUT2). In this position the pump can be run at a different speed to the cylinder unit's in-built pump.

Option 2 (Primary circuit DHW and space heating)

If the second pump is being used in the primary circuit between the cylinder unit and the outdoor unit (Package system ONLY) then the signal cable should be wired to TBO.1 terminals 1 and 2 (OUT1). In this position the pump speed **MUST** match the speed of the cylinder unit's in-built pump.

**Note: Refer to 5.2 Connecting inputs/outputs.**

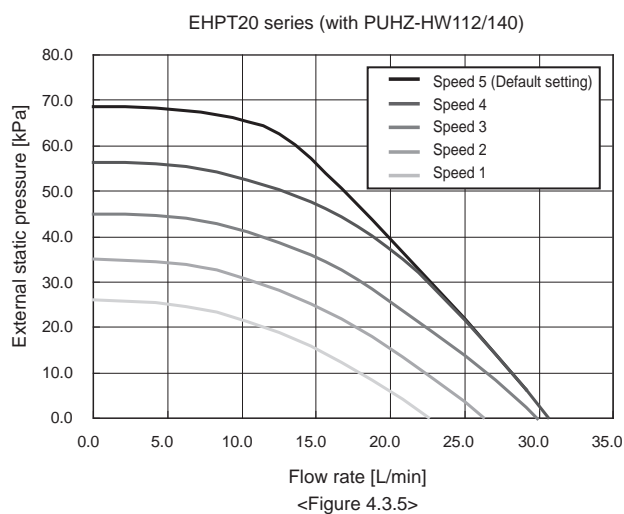
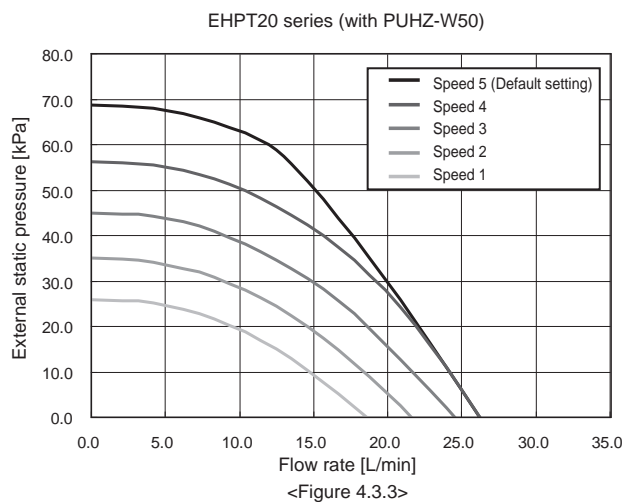
### Water circulation pump characteristics



Outdoor heat pump unit		Water flow rate range [L/min]
Packaged	PUHZ-W50	7.1 - 14.3
	PUHZ-W85	10.0 - 25.8
	PUHZ-HW112	14.4 - 27.7
	PUHZ-HW140	17.9 - 27.7
Split	PUHZ-RP35	7.1 - 11.8
	PUHZ-RP50	7.1 - 17.2
	PUHZ-RP60	8.6 - 20.1
	PUHZ-(H)RP71	10.2 - 22.9
	PUHZ-(H)RP100	14.4 - 27.7
	PUHZ-(H)RP125	17.9 - 27.7
	PUHZ-RP140	20.1 - 27.7
	PUHZ-SW40	7.1 - 11.8
	PUHZ-SW50	7.1 - 17.2
	PUHZ-SW75	10.2 - 22.9
	PUHZ-SW100	14.4 - 27.7
	PUHZ-SW120	20.1 - 27.7
	PUHZ-SHW80	10.2 - 22.9
	PUHZ-SHW112	14.4 - 27.7
PUHZ-SHW140	17.9 - 27.7	

<Table 4.3.1>

\* If the water flow rate is less than 7.1 L/min, the flow switch will be activated.  
If the water flow rate exceeds 27.7 L/min, the flow speed will be greater than 1.5 m/s, which could erode the pipes.



\*For installation of EHPT20 series, set its pump speed with a pressure drop between the cylinder unit and the outdoor unit factored into the external static pressure.

## Immersion heater

When an immersion heater is fitted, do NOT energise the heater until the DHW tank is full of water. Also do NOT energise any immersion heater if any sterilisation chemicals remain in the DHW tank as this will cause premature failure of the heater.

# 4 Installation

## ■ Safety Device Connections

The expansion relief valve on the secondary hot water side, and the temperature and pressure (T&P) relief valve (\*1), situated part way down the DHW tank on the right hand side, both need appropriate discharge pipework. In accordance with Building Regulations a tundish must be fitted into the pipework within 500 mm of the safety device (also see Figure 4.4.1). Due to the distance between the two safety devices it may be necessary to fit each safety device with its own tundish before you run the pipework together to a safe discharge (see Figure 4.3.6). The right side panel has a window (\*2) so that connection can be made to the factory fitted temperature and pressure relief valve. If you wish to make the connection in a different position you will have to cut a hole in the side panel yourself. However it remains necessary that the drainage parameters outlined in the appropriate Building Regulations are complied with.

- \*1 Temperature and pressure relief valve fitted on EHPT20X-VM2HB ONLY.
- \*2 Unscrew the plate on the right-side panel, connect the T&P relief valve to the discharge pipework, and refit the plate. Always replace the plate so that no gaps exist between the plate and side panel and the plate and drain pipe to avoid heat loss.

**Note: Alternatively the discharges from the expansion relief valve and T&P relief valve may commonly discharge to a singular tundish, so long as this tundish is located within 500 mm of the T&P relief valve. When connecting discharge pipes to the safety devices, beware not to strain the inlet connections.**

Diagram part No.	Description	Connection size	Connection type
2	Pressure relief valve	G 1/2	Female
6	Temperature and pressure relief valve (Factory fitted)	15 mm	Compression
★	Expansion relief valve (part of inlet control group)	15 mm	Compression

<Table 4.3.2>

Always refer to local regulations when installing discharge pipework. Install discharge pipework in a frost-free environment. It is necessary to provide appropriate drainage from the pressure relief valve situated on top of the cylinder unit to prevent damage to the unit and the surrounding area from any steam or hot water released. Relief valves MUST NOT be used for any other purpose.

- For UK use WK01UK-E kit, for other countries please see below;
- Any discharge pipework should be capable of withstanding discharge of hot water. Discharge pipework should be installed in a continuously downward direction. Discharge pipework must be left open to the environment.

<Pressure relief valve included with the cylinder unit>  
 \* Only EHPT20X-VM2HB does not include following pressure relief valve.

Item	Quantity
Pressure relief valve (1.0 MPa (10 bar))	1

Install a pressure relief valve (1.0MPa (10 bar)) on the local piping connected to the cold water inlet. A pressure relief valve should be installed between the pressure reducing valve and the cylinder unit (see Figures 3.6, 3.7 and 3.9). **Note: It is essential no check valve or isolation valve is fitted between the cylinder unit connection and the 10 bar pressure relief valve accessory (safety matter).** The connection size is G1/2" (the drain connection size G3/4"). The cold water inlet can be identified on the diagram label on top of the cylinder unit.

<Accessory location>  
 The pressure relief valve accessory pack can be found inside the cylinder unit, taped to the base.

## ■ Piping diagram for 2-zone temperature control

Connect the pipe work and field supplied parts according to the relevant circuit diagram shown in Section 3. Technical Information, of this manual. For more details on wiring, refer to "5.3 Wiring for 2-zone temperature controls".

**Note: Do not install the thermistors on the mixing tank. This could affect correct monitoring of flow and return temperatures through each zone. Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.**

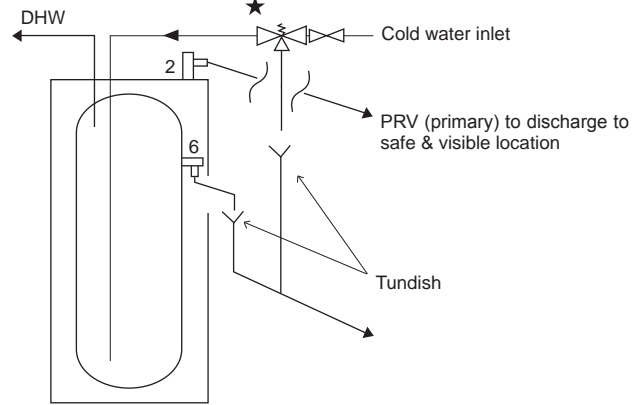
## 4.4 Refrigerant Pipework

Refer to the outdoor unit installation manual.

Match the outer diameter of the refrigerant pipe between the outdoor unit and cylinder unit with that of the refrigerant pipe on the outdoor unit. If they do not match, connect the following adapter to the refrigerant pipe on the cylinder unit.

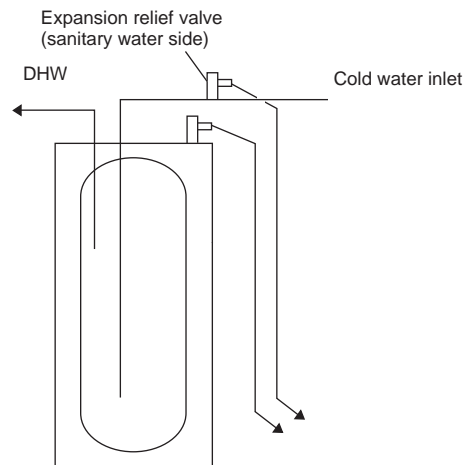
Model name	Connected pipes diameter (mm)	Diameter A (mm)	Diameter B (mm)
PAC-SH50RJ-E	ø15.88 → ø12.7	ø15.88 (5/8 F)	ø12.7 (1/2 F)
PAC-SH30RJ-E	ø9.52 → ø6.35	ø9.52 (3/8 F)	ø6.35 (1/4 F)

### EHPT20X-VM2HB (for UK)

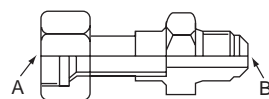


### Other models

The expansion vessel on the sanitary water side shall be installed as necessary in accordance with your local regulations.



<Figure 4.3.6>



<Cylinder unit side>                      <Extension pipe side>

<Figure 4.4.1>

# 4 Installation

## 4.5 Safety Device Discharge Arrangements (G3)

The following instructions are a requirement of UK Building Regulations and must be adhered to. For other countries please refer to local legislation. If you are in any doubt please seek advice from local building planning office.

1. Position the inlet control group so that discharge from both safety valves can be joined together via a 15 mm end feed Tee.
2. Connect the tundish and route the discharge pipe as shown in Figure 4.5.1.
3. The tundish should be fitted vertically and as close to the safety device as possible and within 500 mm of the device.
4. The tundish should be visible to occupants and positioned away from electrical devices.
5. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal construction and:

A) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9 m long i.e. discharge pipes between 9 m and 18 m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27 m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to Figure 4.5.1, Table 4.5.1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.

B) Have a vertical section of pipe at least 300 mm long, below the tundish before any elbows or bends in the pipework.

C) Be installed with a continuous fall.

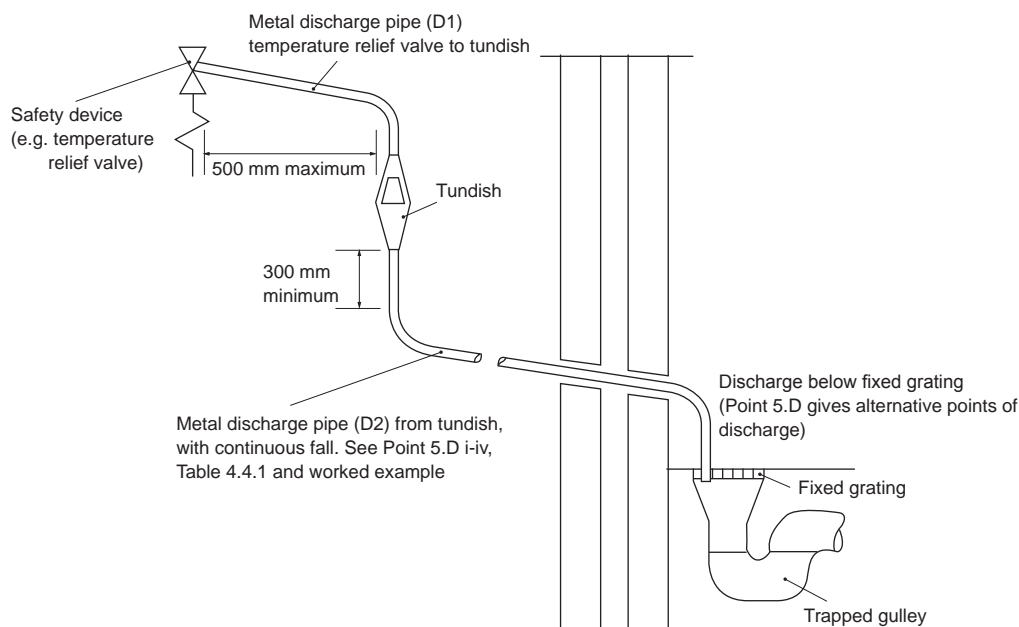
D) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:

- i. Ideally below a fixed grating and above the water seal in a trapped gully.
- ii. Downward discharges at low level; i.e. up to 100 mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.
- iii. Discharges at high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3 m from any plastics guttering system that would collect such discharges (tundish visible).
- iv. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

**Note:** The discharge will consist of scalding water and steam. Asphalt, roofing felt and nonmetallic rainwater goods may be damaged by such discharges.

**Worked example:** The example below is for a G½ temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7 m from the tundish to the point of discharge.

From Table 4.5.1: Maximum resistance allowed for a straight length of 22 mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0 m subtract the resistance for 4 No. 22 mm elbows at 0.8 m each = 3.2 m. Therefore the maximum permitted length equates to: 5.8 m. 5.8 m is less than the actual length of 7 m, therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28 mm pipe (D2) from a G½ temperature relief valve equates to: 18 m Subtract the resistance for 4 No. 28 mm elbows at 1.0 m each = 4 m. Therefore the maximum permitted length equates to: 14 m. As the actual length is 7 m, a 28 mm (D2) copper pipe will be satisfactory.



<Figure 4.5.1>

Valve outlet size	Minimum size of discharge pipe D1	Minimum size of discharge pipe D2 from tundish	Maximum resistance allowed, expressed as a length of straight pipe (no elbows or bends)	Resistance created by each elbow or bend
G 1/2	15 mm	22 mm	Up to 9 m	0.8 m
		28 mm	Up to 18 m	1.0 m
		35 mm	Up to 27 m	1.4 m
G 3/4	22 mm	28 mm	Up to 9 m	1.0 m
		35 mm	Up to 18 m	1.4 m
		42 mm	Up to 27 m	1.7 m
G1	28 mm	35 mm	Up to 9 m	1.4 m
		42 mm	Up to 18 m	1.7 m
		54 mm	Up to 27 m	2.3 m

<Table 4.5.1>

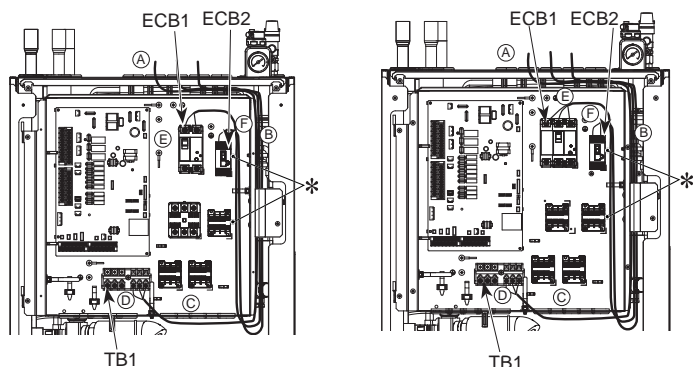
GB

# 4 Installation

## 4.6 Electrical Connection

All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations.

Breaker abbreviation	Meaning
ECB1	Earth leakage circuit breaker for booster heater
ECB2	Earth leakage circuit breaker for immersion heater
TB1	Terminal block 1



<1 phase (with immersion heater)>

<3 phase (with immersion heater)>

Option 1: Cylinder unit powered via outdoor unit  
<1 phase>

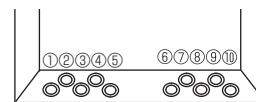
The cylinder unit can be powered in two ways.

1. Power cable is run from the outdoor unit to the cylinder unit.
2. Cylinder unit has independent power source

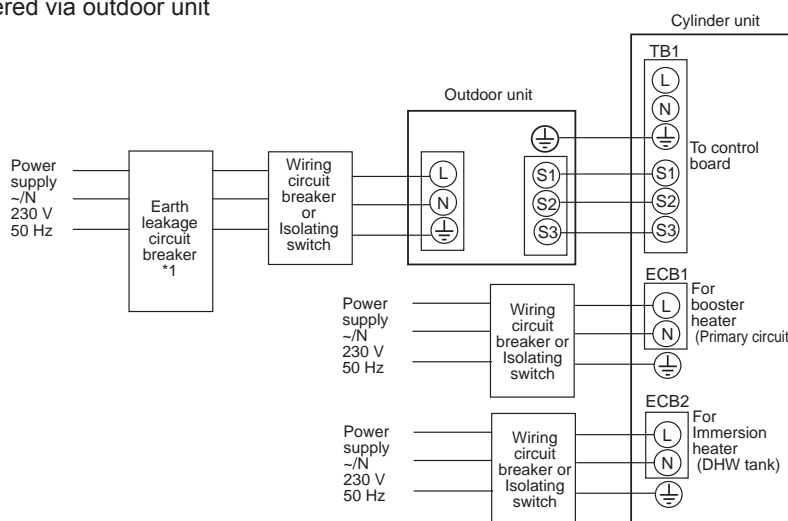
Connections should be made to the terminals indicated in the figures to the left below depending on the phase.

Booster heater and immersion heater should be connected independently from one another to dedicated power supplies.

- Ⓐ Locally supplied wiring should be inserted through the inlets situated on the top of the cylinder unit. (Refer to <Table 3.6>.)
- Ⓑ Wiring should be fed down the right hand side of the control and electrical box and clamped in place using clips provided.
- Ⓒ The wires should be inserted individually through the cable inlets as below.
- ④ Outputs wire
- ⑤ Signal input wire
- ⑥ Wireless receiver (option) wire (PAR-WR51R-E)
- ⑦ to ⑩ Power line and indoor-outdoor wire
- ⑪ Connect the outdoor unit – cylinder unit connecting cable to TB1.
- Ⓔ Connect the power cable for the booster heater to ECB1.
- Ⓕ If immersion heater is present, connect the power cable to ECB2.



- Avoid contact between wiring and parts (\*).
- Make sure that ECB1 and ECB2 are ON.
- On completion of wiring ensure main controller cable is connected to the relay connector.



\*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

\*2 Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units

<Figure 4.6.1>  
Electrical connections 1 phase

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm <sup>2</sup>
		6 kW	32 A *1	6.0 mm <sup>2</sup>
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm <sup>2</sup>

Wiring No. Wiring size (mm <sup>2</sup> )	Cylinder unit - Outdoor unit		
		*2	3 x 1.5 (polar)
	*2	1 x Min. 1.5	
Circuit rating	Cylinder unit - Outdoor unit S1 - S2	*3	230 V AC
	Cylinder unit - Outdoor unit S2 - S3	*3	24 V DC

\*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

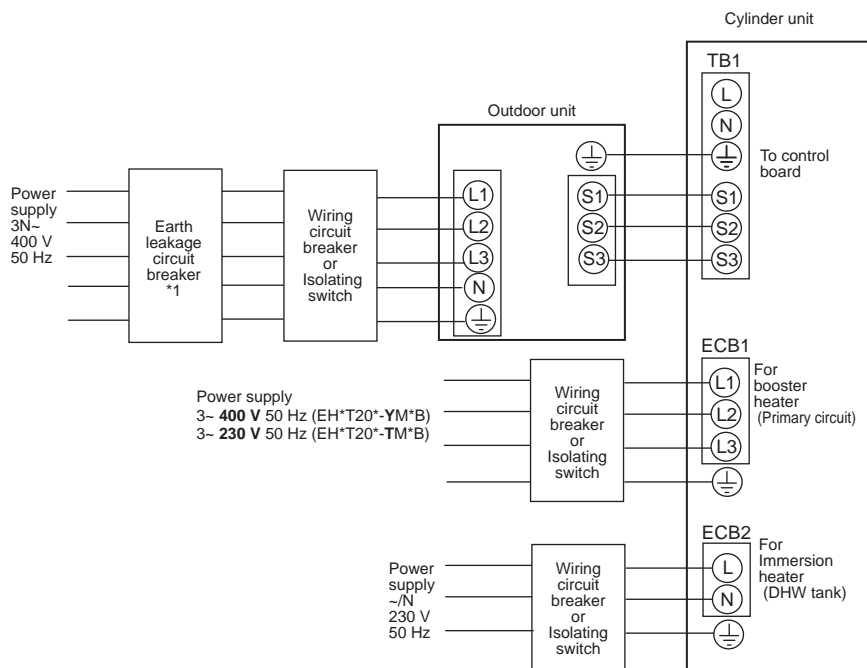
\*2. Max. 45 m  
If 2.5 mm<sup>2</sup> used, Max. 50 m  
If 2.5 mm<sup>2</sup> used and S3 separated, Max. 80 m

\*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
  2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)  
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
  3. Install an earth longer than other cables.
  4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

# 4 Installation

<3 phase>



\*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

\*2 Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units

<Figure 4.6.2>  
Electrical connections 3 phase

Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm <sup>2</sup>
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm <sup>2</sup>
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm <sup>2</sup>

Wiring No. x size (mm <sup>2</sup> )	Cylinder unit - Outdoor unit	*2	3 x 1.5 (polar)
	Cylinder unit - Outdoor unit earth	*2	1 x Min. 1.5
Circuit rating	Cylinder unit - Outdoor unit S1 - S2	*3	230 V AC
	Cylinder unit - Outdoor unit S2 - S3	*3	24 V DC

\*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

\*2. Max. 45 m

If 2.5 mm<sup>2</sup> used, Max. 50 m

If 2.5 mm<sup>2</sup> used and S3 separated, Max. 80 m

\*3. The values given in the table above are not always measured against the ground value.

Note:

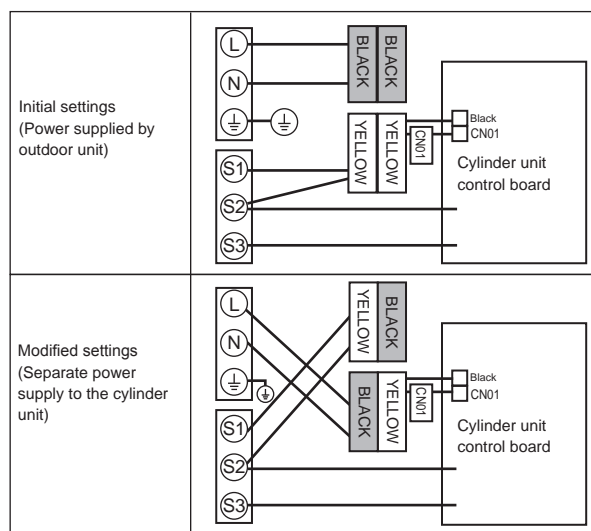
1. Wiring size must comply with the applicable local and national codes.
2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)  
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
3. Install an earth longer than other cables.
4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

# 4 Installation

## Option 2: Cylinder unit powered by independent source.

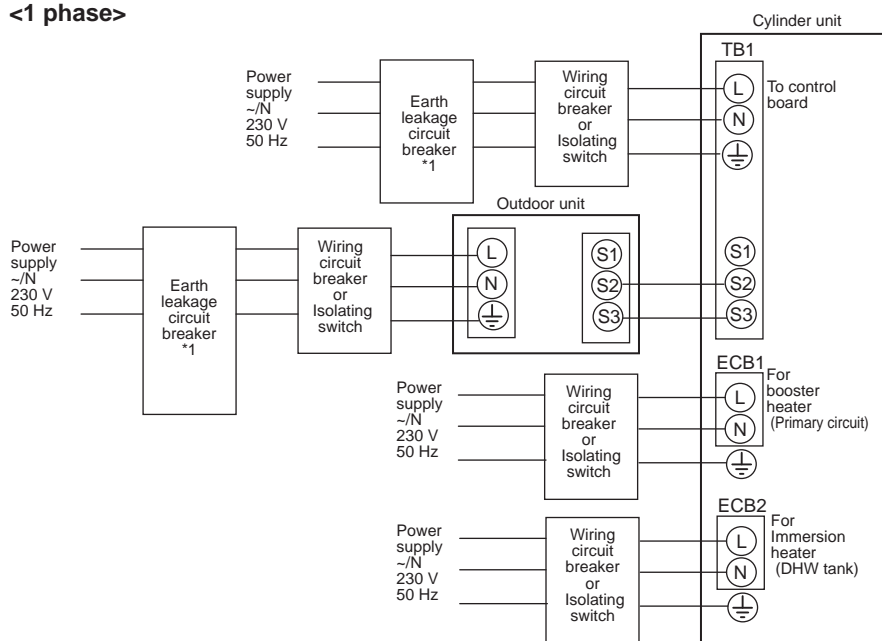
If the cylinder unit and outdoor unit have separate power supplies, the following requirements MUST be carried out:

- Change the connector connections in the control and electrical box of the cylinder unit (see Figure 4.6.3)
- Turn the outdoor unit DIP switch SW8-3 to ON
- Turn on the outdoor unit BEFORE the cylinder unit.



<Figure 4.6.3>

<1 phase>



\*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

\*2 Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.4>  
Electrical connections 1 phase

Description	Power supply	Capacity	Breaker	Wiring
Booster heater (Primary circuit)	~N 230 V 50 Hz	2 kW	16 A *1	2.5 mm <sup>2</sup>
		6 kW	32 A *1	6.0 mm <sup>2</sup>
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm <sup>2</sup>

Cylinder unit power supply		~N 230 V 50 Hz
Cylinder unit input capacity		
Main switch (Breaker)		*1 16 A
Wiring Wiring No. x size (mm <sup>2</sup> )	Cylinder unit power supply	2 x Min. 1.5
	Cylinder unit power supply earth	1 x Min. 1.5
	Cylinder unit - Outdoor unit	*2 2 x Min. 0.3
	Cylinder unit - Outdoor unit earth	—
Circuit rating	Cylinder unit L - N	*3 230 V AC
	Cylinder unit - Outdoor unit S1 - S2	*3 —
	Cylinder unit - Outdoor unit S2 - S3	*3 24 V DC

\*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

\*2. Max. 120 m

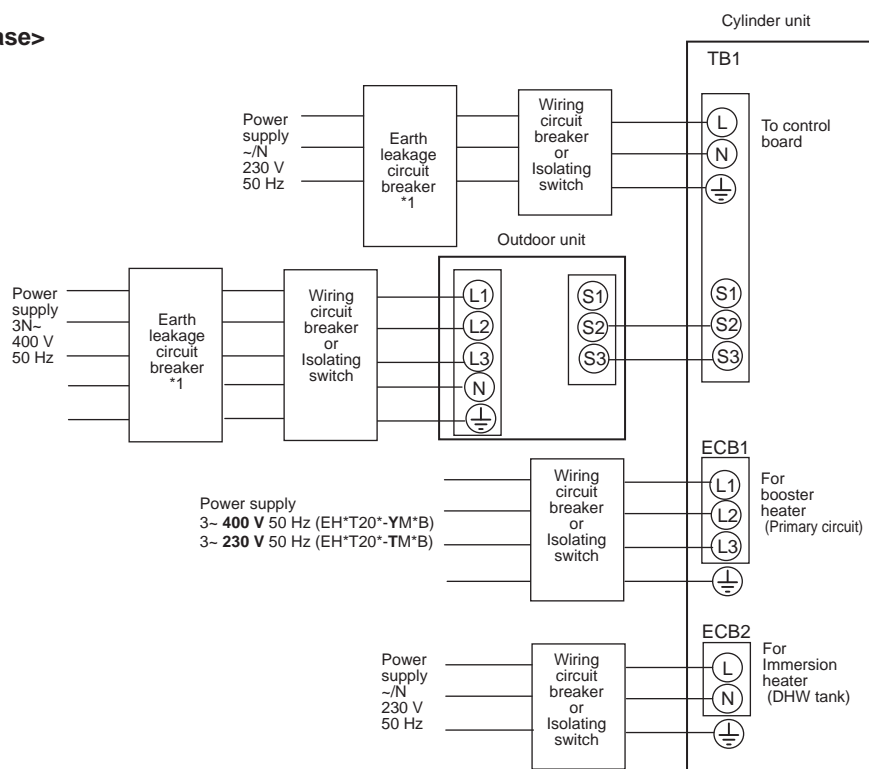
\*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
  2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)  
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
  3. Install an earth longer than other cables.
  4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.



# 4 Installation

<3 phase>



\*1 If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

\*2 Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.5>  
Electrical connections 3 phase

Description	Power supply	Capacity (Indoor unit Ref.)	Breaker	Wiring
Booster heater (Primary circuit)	3~ 400 V 50 Hz	9 kW	16 A *1	2.5 mm <sup>2</sup>
	3~ 230 V 50 Hz	9 kW	32 A *1	6.0 mm <sup>2</sup>
Immersion heater (DHW tank)	~N 230 V 50 Hz	3 kW	16 A *1	2.5 mm <sup>2</sup>

Cylinder unit power supply		~N 230 V 50 Hz
Cylinder unit input capacity		
Main switch (Breaker)		*1 16 A
Wiring No. x size (mm <sup>2</sup> )	Cylinder unit power supply	2 x Min. 1.5
	Cylinder unit power supply earth	1 x Min. 1.5
	Cylinder unit - Outdoor unit	*2 2 x Min. 0.3
	Cylinder unit - Outdoor unit earth	—
Circuit rating	Cylinder unit L - N	*3 230 V AC
	Cylinder unit - Outdoor unit S1 - S2	*3 —
	Cylinder unit - Outdoor unit S2 - S3	*3 24 V DC

\*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

\*2. Max. 120 m

\*3. The values given in the table above are not always measured against the ground value.

- Note:**
1. Wiring size must comply with the applicable local and national codes.
  2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)  
Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)
  3. Install an earth longer than other cables.
  4. Please keep enough output capacity of power supply for each heater. The lack of the power supply capacity might cause chattering.

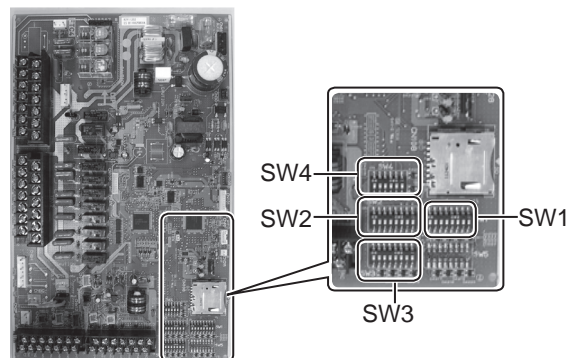
# 5 System Set Up

## 5.1 Dip Switch Functions

Located on the FTC4 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below in Table 5.1.1.

Make sure to turn off both indoor unit and outdoor unit power supplies before changing the switch settings.



<Figure 5.1.1>

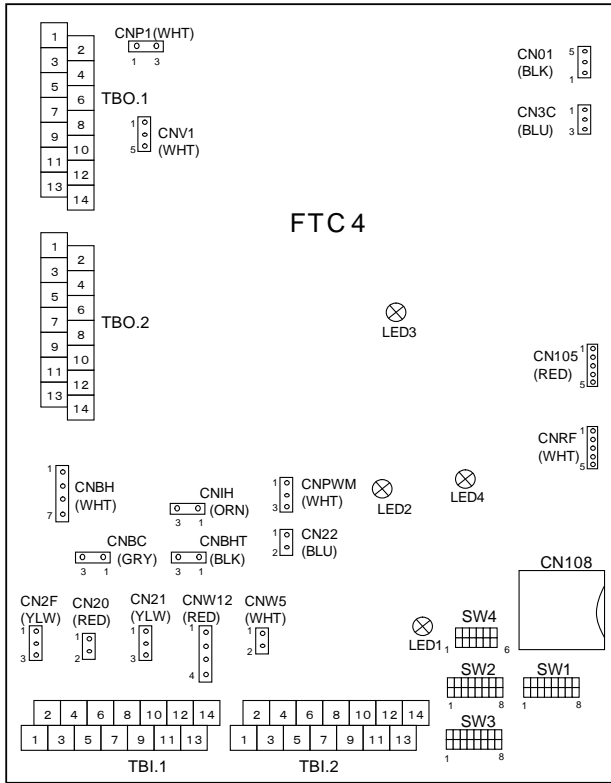
Dip switch		Function	OFF	ON	Default settings: Indoor unit model
SW1	SW1-1	Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2	Heat pump maximum outlet water temperature	55°C	60°C	ON *1
	SW1-3	DHW tank	WITHOUT DHW tank	WITH DHW tank	ON
	SW1-4	Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	OFF: Except EHST20C-*M*HB EHPT20-*M*HB ON : EHST20C-*M*HB EHPT20X-*M*HB
	SW1-5	Booster heater	WITHOUT Booster heater	WITH Booster heater	ON
	SW1-6	Booster heater function	For heating only	For heating and DHW	ON
	SW1-7	Outdoor unit type	Split type	Packaged type	OFF: EHST20C-*M**B ON : EHPT20X-*M**B
	SW1-8	Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1	Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2	Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	ON
	SW2-3	Booster heater capacity restriction	Inactive	Active	OFF: Except EH*T20*-VM2*B ON : EH*T20*-VM2*B
	SW2-4	—	—	—	OFF
	SW2-5	Automatic switch to backup heat source operation (When outdoor unit stops by error)	Inactive	Active *2	OFF
	SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7	2-zone temperature control	Inactive	Active	OFF
	SW2-8	—	—	—	OFF
SW3	SW3-1	Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2	Flow switch 2 input (IN3) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3	Flow switch 3 input (IN7) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-4	—	—	—	OFF
	SW3-5	Heating mode function *3	Inactive	Active	OFF
	SW3-6	—	—	—	OFF
	SW3-7	—	—	—	OFF
	SW3-8	—	—	—	OFF
SW4	SW4-1	—	—	—	OFF
	SW4-2	—	—	—	OFF
	SW4-3	—	—	—	OFF
	SW4-4	—	—	—	OFF
	SW4-5	Emergency mode (Heater only operation)	Normal	Emergency mode (Heater only operation) (To be activated only when powered ON)	OFF *4
	SW4-6	Emergency mode (Boiler operation)	Normal	Emergency mode (Boiler operation) (To be activated only when powered ON)	OFF *4

<Table 5.1.1>

- Note:**
- \*1. When the cylinder unit is connected with a PUHZ-RP outdoor unit of which maximum outlet water temperature is 55°C, Dip SW1-2 must be changed to OFF.
  - \*2. External output (OUT11) will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)
  - \*3 This switch functions only when the cylinder unit is connected with a PUHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is active regardless of the fact that this switch is ON or OFF.
  - \*4. If emergency mode is no longer required, return the switch to OFF position.

# 5 System Set Up

## 5.2 Connecting inputs/outputs



When the wires are wired to adjacent terminals use ring terminals and insulate the wires.

<Figure 5.2.1>

### ■ Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 1-2	—	Room thermostat 1 input	Refer to SW2-1 in <5.1 Dip Switch Functions>.	
IN2	TBI.1 3-4	CN2F	Flow switch 1 input	Refer to SW2-2 in <5.1 Dip Switch Functions>.	
IN3	TBI.1 5-6	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <5.1 Dip Switch Functions>.	
IN4	TBI.1 7-8	—	Demand control input	Normal	Heat source OFF/ Boiler operation *2
IN5	TBI.1 9-10	—	Outdoor thermostat input (*1)	Standard operation	Heater operation/ Boiler operation *2
IN6	TBI.1 11-12	—	Room thermostat 2 input	Refer to SW3-1 in <5.1 Dip Switch Functions>.	
IN7	TBI.1 13-14	—	Flow switch 3 input (Zone2)	Refer to SW3-3 in <5.1 Dip Switch Functions>.	

\*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

\*2. To turn on the boiler operation, use the main controller to select "Boiler" in "External input setting" screen in the service menu.

### Wiring specification and field supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 10 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm <sup>2</sup> to 1.25 mm <sup>2</sup> Solid wire: ø0.65 mm to ø1.2 mm
	Switch	Non-voltage "a" contact signals Remote switch: minimum applicable load 12V DC, 0.1mA

### ■ Thermistor inputs

Name	Terminal block	Connector	Item	Optional part model
TH1	—	CN20	Thermistor (Room temp.) (Option) *1	PAC-SE41TS-E
TH2	—	CN21	Thermistor (Ref. liquid temp.)	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—
THW5	—	CNW5	Thermistor (DHW tank water temp.)	—
THW6	TBI.2 7-8	—	Thermistor (Zone1 flow water temp.) (Option)*1	
THW7	TBI.2 9-10	—	Thermistor (Zone1 return water temp.) (Option)*1	PAC-TH011-E
THW8	TBI.2 1-2	—	Thermistor (Zone2 flow water temp.) (Option)*1	
THW9	TBI.2 11-12	—	Thermistor (Zone2 return water temp.) (Option)*1	PAC-TH011-E
THWB1	TBI.2 3-4	—	Thermistor (Boiler flow water temp.) (Option)*1	
THWB2	TBI.2 5-6	—	Thermistor (Boiler return water temp.) (Option)*1	PAC-TH011HT-E

Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature.

If the wiring is too long, bundle it with a strap to adjust the length.

\*1. The maximum length of the thermistor wiring is 5 m.

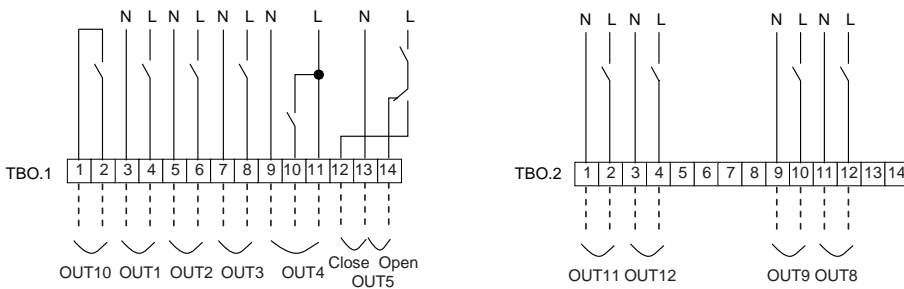
When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.

# 5 System Set Up

## Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current	Max. total current
OUT1	TBO.1 3-4	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON	230V AC 1.0 A Max	3.0 A (a)
OUT2	TBO.1 5-6	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON	230V AC 1.0 A Max	
OUT3	TBO.1 7-8	—	Water circulation pump 3 output (Space heating for Zone2)	OFF	ON	230V AC 1.0 A Max	
OUT4	TBO.1 9-11	CNV1	3-way valve 1 output	Heating	DHW	230V AC 0.1 A Max	3.0 A (b)
OUT5	TBO.1 12-13	—	Mixing valve output	Stop	Close	230V AC 0.1 A Max	
	TBO.1 13-14			Open			
OUT6	—	CNBH 1-3	Booster heater 1 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT7	—	CNBH 5-7	Booster heater 2 output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT8	TBO.2 11-12	—	Booster heater 2+ output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT9	TBO.2 9-10	CNIH	Immersion heater output	OFF	ON	230V AC 0.5 A Max (Relay)	
OUT11	TBO.2 1-2	—	Error output	Normal	Error	230V AC 0.5 A Max	
OUT12	TBO.2 3-4	—	Defrost output	Normal	Defrost	230V AC 0.5 A Max	
OUT10	TBO.1 1-2	—	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) 0.5 A or less • 10 mA 5V DC or more	—

Do not connect to the terminals that are indicated as “—” in the “Terminal block” field.



### Wiring specification and field supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.5 mm <sup>2</sup> to 1.25 mm <sup>2</sup> Solid wire: ø0.65 mm to ø1.2 mm

### Note:

- When the cylinder unit is powered via outdoor unit, the maximum grand total current of (a)+(b) is 3.0 A.
- Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2, and OUT3). In such a case, connect them via (a) relay(s).
- Do not connect water circulation pumps to both TBO.1 3-4 and CNP1 at the same time.
- Connect an appropriate surge absorber to OUT10 (TBO.1 1-2) depending on the load at site.

## 5.3 Wiring for 2-zone temperature control

### 1. Water circulation pump 2 (Zone1 water circulation pump) / Water circulation pump 3 (Zone2 water circulation pump)

Electrically wire water circulation pumps 2 and 3 to the appropriate output terminals. (Refer to “Outputs” in 5.2.)

### 2. Flow switch 2 (Zone1 flow switch) / Flow switch 3 (Zone2 flow switch)

Connect flow switches 2 and 3 to the appropriate terminals. (Refer to “Signal inputs” in 5.2.)

Set dip switches 3-2 and 3-3 according to the functions of individual flow switches 2 and 3. (Refer to “Dip switch functions” in 5.1.)

### 3. Thermistor

Connect the thermistor to monitor the Zone1 flow temp. to the THW6 (TBI. 2-7 and 2-8) terminals.

Connect the thermistor to monitor the Zone1 return temp. to the THW7 (TBI. 2-9 and 2-10) terminals.

Connect the thermistor to monitor the Zone2 flow temp. to the THW8 (TBI. 2-1 and 2-2) terminals.

Connect the thermistor to monitor the Zone2 return temp. to the THW9 (TBI. 2-11 and 2-12) terminals.

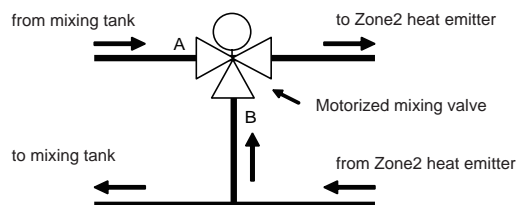
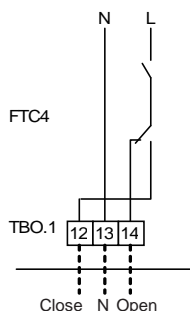
The maximum length of the thermistor wiring is 5 m. Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each hot water temperature through zones.

If the wiring is too long, bundle it with a strap to adjust the length.

### 4. Motorized mixing valve

Connect three wires coming from the motorized mixing valve to the appropriate terminals referring to “Outputs” in 5.2.

**Note:** Connect the signal line to open Port A (hot water inlet port) to TBO. 1-14 (Open), the signal line to open Port B (cold water inlet port) to TBO. 1-12 (Close), and the neutral terminal wire to TBO. 1-13 (N).



# 5 System Set Up

## 5.4 Remote Controller Options

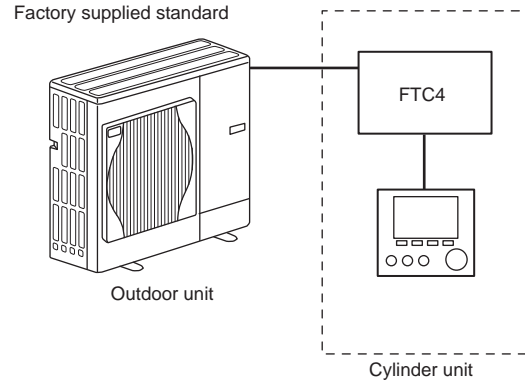
The cylinder unit comes factory fitted with a main controller. This incorporates a thermistor for temperature monitoring and a graphical user interface to enable set-up, view current status and input scheduling functions. The main controller is also used for servicing purposes. This facility is accessed via password protected service menus.

To provide the best efficiency Mitsubishi Electric recommends using automatic adaptation function based on room temperature. To use this function a room thermistor needs to be present in a main living area. This can be done in a number of ways the most convenient are detailed below.

**Refer to heating section of this manual for instructions on how to set compensation curve, flow temp or room temp (Auto adaptation).**

**For instructions on how to set the thermistor input for the FTC4 please refer to Initial settings section.**

The factory setting for space heating mode is set to Room temp. (auto adaptation). If there is no room sensor present in the system, this setting must be changed to either Compensation curve mode or Flow temp mode.



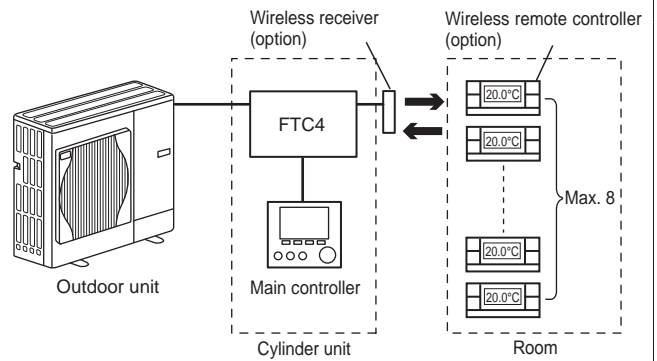
### ■ 1-zone temperature control

**Control option A**

This option features the main controller and the Mitsubishi Electric wireless remote controller. The wireless remote controller is used to monitor room temperature and can be used to make changes to the space heating settings, boost DHW and switch to holiday mode without having to directly use the main controller.

If more than one wireless remote controller is used, the most recently requested temperature setting will commonly be applied to all rooms by the central control system regardless of which wireless remote controller was used. No hierarchy exists across these remote controllers.

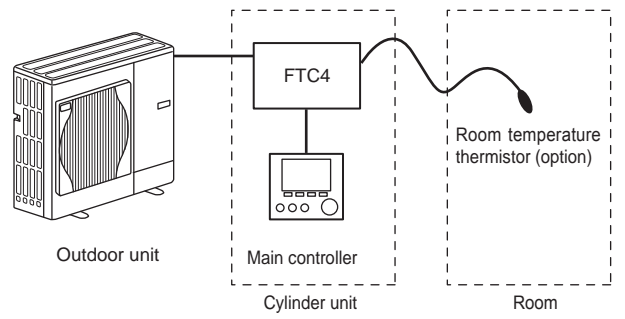
Wire the wireless receiver to FTC4 referring to the wireless remote controller instruction manual. **Turn DIP SW1-8 to ON.** Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.)



**Control option B**

This option features the main controller and the Mitsubishi Electric thermistor wired to FTC4. The thermistor is used to monitor room temperature but can not make any changes in control operation. Any changes to DHW must be made using the main controller mounted on the cylinder unit.

Wire the thermistor to the TH1 connector on FTC4. The number of room temperature thermistors that can be connected to FTC4 is always one.

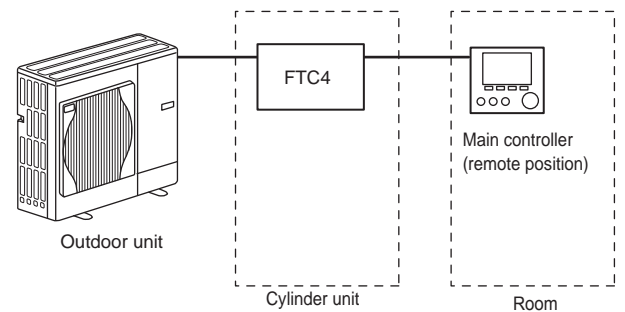


**Control option C**

This option features the main controller being removed from the cylinder unit and situated in a different room. A thermistor built in the main controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main controller available.

The main controller and FTC4 are connected by a 2-core, 0.3 mm<sup>2</sup>, non-polar cable (field supply) with a maximum length of 500 m.

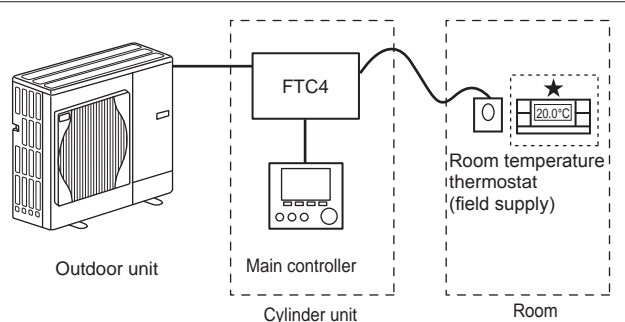
To use the sensor in the main controller the main controller should come off from the cylinder unit. Otherwise it will detect the temperature of the cylinder unit instead of room temperature. This will affect the output of the space heating.



**Control option D (Flow temp. or compensation curve only)**

This option features the main controller and a locally supplied thermostat wired to FTC4. The thermostat is used to set the maximum temperature for heating room. Any changes to DHW must be made using main controller mounted on the cylinder unit.

The thermostat is wired to IN1 in TBI.1 on FTC4. The number of thermostats that can be connected to FTC4 is always one.



★ The wireless remote controller can be also used as a thermostat.

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# 5 System Set Up

## 2-zone temperature control

### Control option A

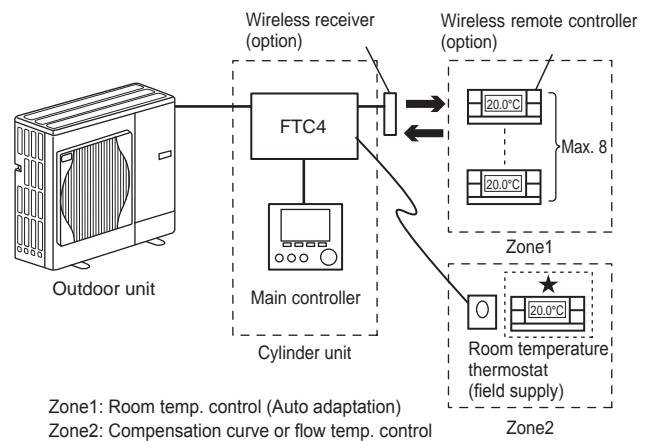
This option features the main controller, the Mitsubishi Electric wireless remote controller and a locally supplied thermostat. The wireless remote controller is used to monitor the Zone1 room temperature and the thermostat is used to monitor the Zone2 room temperature. The thermostat can be also allocated to Zone1 and the wireless remote controller to Zone2.

The wireless remote controller can be also used to make changes to the space heating settings, boost DHW and switch to holiday mode without having to use the main controller.

If more than one wireless remote controller is used, the last temperature setting adjustment/demand will be applied to ALL rooms in same zone.

Wire the wireless receiver to FTC4 referring to the wireless remote controller instruction manual. Turn DIP SW1-8 to ON. Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.)

The thermostat is used to set the maximum temperature for heating Zone2 room. The thermostat is wired to IN6 on FTC4. (If the thermostat is allocated to Zone1, it is wired to IN1 on TBI.1.) (Refer to 5.2.)



### Control option B

This option features the main controller, the Mitsubishi Electric thermistor and a locally supplied thermostat that are wired to FTC4. The thermistor is used to monitor the Zone1 room temperature and the thermostat is used to control the Zone2 room temperature.

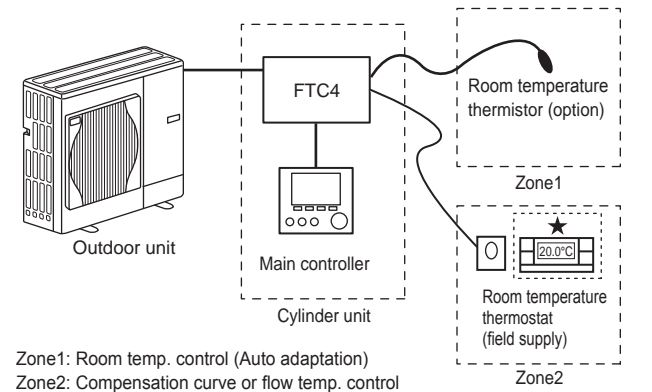
The thermostat can be also allocated to Zone1 and the thermistor to Zone2. The thermistor can not make any changes in control operation. Any changes to DHW must be made using the main controller mounted on the cylinder unit.

Wire the thermistor to the TH1 connector on FTC4.

The number of room temperature thermistors that can be connected to FTC4 is always one.

The thermostat is used to set the maximum temperature for heating Zone2 room.

The thermostat is wired to IN6 on FTC4. (If the thermostat is allocated to Zone1, wire it to IN1 on TBI.1.) (Refer to 5.2.)



### Control option C

This option features the main controller (with in-built thermistor) that is removed from the cylinder unit to monitor the Zone1 room temperature and a locally supplied thermostat to monitor the Zone2 room temperature.

The thermostat can be also allocated to Zone1 and the thermistor to Zone2.

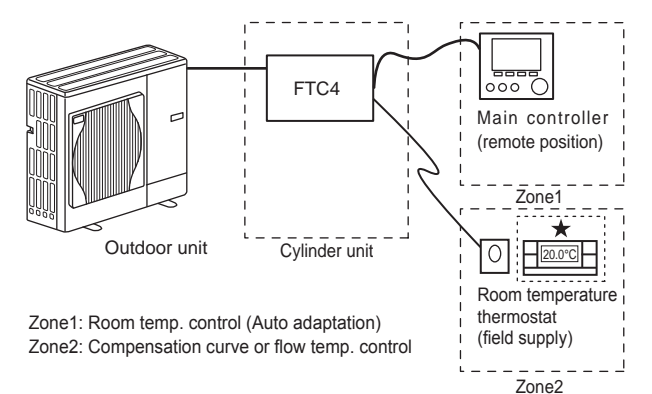
A thermistor built into the main controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main controller available.

The main controller and FTC4 are connected by a 2-core, 0.3 mm<sup>2</sup>, non-polar cable (field supply) with a maximum length of 500 m.

To use the sensor in the main controller the main controller should be detached from the cylinder unit. Otherwise it will detect the temperature of the cylinder unit instead of room temperature. This will affect the output of the space heating.

The thermostat is used to set the maximum temperature for heating Zone2 room.

The thermostat is wired to IN6 on FTC4. (If the thermostat is allocated to Zone1, wire it to external input IN1 on TBI.1.) (Refer to 5.2.)

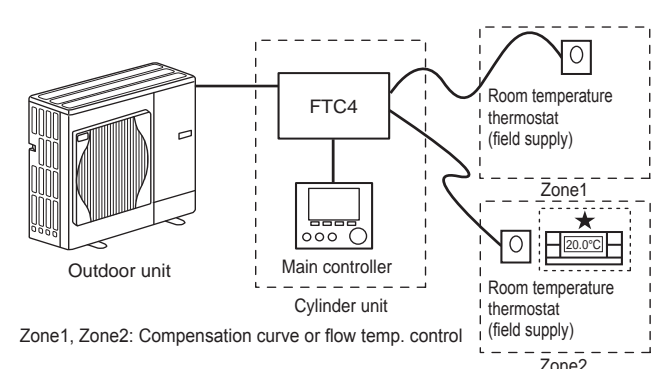


### Control option D

This option features the locally supplied thermostats wired to FTC4. The thermostats are individually allocated to Zone1 and Zone2. The thermostats are used to set each maximum temperature for heating Zone1 and Zone2 rooms. Any changes to DHW must be made using the main controller mounted on the cylinder unit.

The thermostat for Zone1 is wired to IN1 in TBI.1 on FTC4.

The thermostat for Zone2 is wired to IN6 in TBI.1 on FTC4.



\* For the options above, the sensor types can be exchanged between Zone1 and Zone2. (e.g. Wireless remote controller in Zone1 and Room temp thermostat in Zone2 can be changed to Room temp thermostat and wireless remote controller, respectively).

★ The wireless remote controller can be also used as a thermostat.



# 5 System Set Up

## Remote Installation of Main Controller

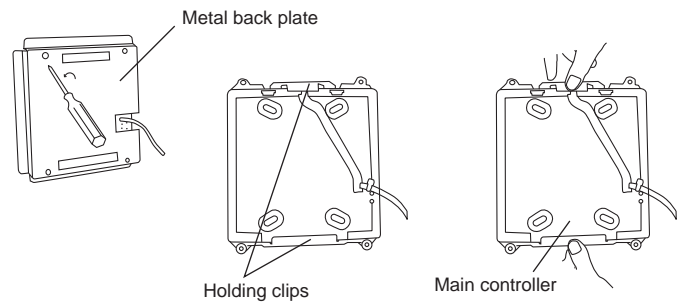
The following instructions are related to a system controlled as in Control option C.

### <Accessory>

Main controller cover

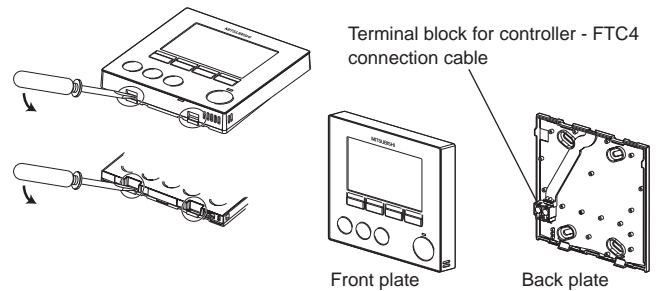
### <Removing the main controller from the cylinder unit>

1. Open front panel of cylinder unit. (See Section 4.2.)
2. Remove the four screws from the metal back plate of main controller using a screwdriver. (Figure 5.4.1.)
3. Lift off the metal back plate.
4. Gently pull apart the clips holding the main controller in place. Be careful not to use too much force as this may break the holding clips.
5. Lift out the main controller from the front panel of the cylinder unit.



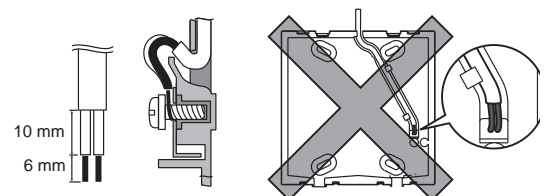
<Figure 5.4.1>  
Removing main controller

6. Separate the back and front plates using a flat head screwdriver as shown in Figure 5.4.2.



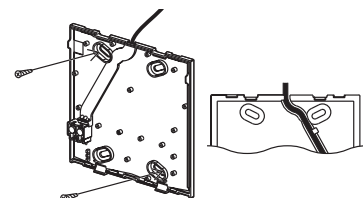
<Figure 5.4.2>  
Opening the main controller

7. Fix the 2 core cable from the FTC4 into the terminal. Ensure the wires make good contact and are securely screwed into the terminal block. (Figure 5.4.3)
8. The inner core wires should not be visible from the outside of the back plate. (Figure 5.4.3)
9. The sheathed cable should be pressed into the sunken channel so it is flush with the back plate.
10. Once the connection cable is in place screw the back plate to the wall using screws (field supply) suitable for use on the chosen wall. (Figure 5.4.4)
11. Finally replace the front plate.



<Figure 5.4.3>  
Securing the connection cable

**Note:** Wiring for main controller cable shall be (5 cm or more) apart from power source wiring so that it is not influenced by electrical noise from power source wiring. (Do NOT insert main controller cable and power source wiring in the same conduit.)



<Figure 5.4.4>  
Securing the back plate to the wall

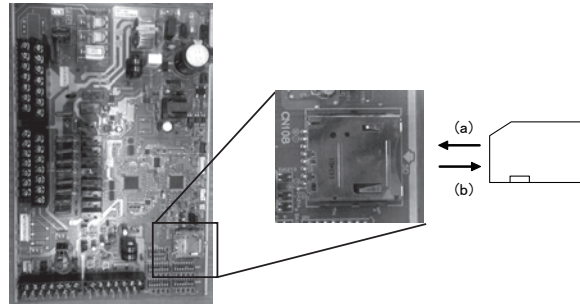
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# 5 System Set Up

## 5.5 Using SD memory card

The cylinder unit is equipped with an SD memory card interface in FTC4. Using an SD memory card can simplify main controller settings and can store operating logs. \*1

(a) For insertion, push on the SD memory card until it clicks into place.  
 (b) For ejection, push on the SD memory card until it clicks.  
**Note: To avoid cutting fingers, do not touch sharp edges of the SD memory card connector (CN108) on the FTC4 control board.**



### <Handling precautions>

- (1) Use an SD memory card that complies with the SD standards. Check that the SD memory card has a logo on it of those shown to the right.
- (2) SD memory cards to the SD standards include SD, SDHC, miniSD, micro SD, and microSDHC memory cards. The capacities are available up to 32 GB. Choose that with a maximum allowable temperature of 55°C.
- (3) When the SD memory card is a miniSD, miniSDHC, microSD, or micro SDHC memory card, use an SD memory card converter adapter.
- (4) Before writing to the SD memory card, release the write-protect switch.



- (5) Before inserting or ejecting an SD memory card, make sure to power off the system. If an SD memory card is inserted or ejected with the system powered on, the stored data could be corrupted or the SD memory card be damaged. \*An SD memory card is live for a whilst after the system is powered off. Before insertion or ejection wait until the LED lamps on the FTC4 control board are all off.
- (6) The read and write operations have been verified using the following SD memory cards, however, these operations are not always guaranteed as the specifications of these SD memory cards could change.

Manufacturer	Model	Tested in
Verbatim	#44015 0912-61	Mar. 2012
SanDisk	SDSDB-002G-B35	Oct. 2011
Panasonic	RP-SDP04GE1K	Oct. 2011
Arvato	2GB PS8032 TSB 24nm MLC	Jun. 2012

Before using a new SD memory card (including the card that comes with the unit), always check that the SD memory card can be safely read and written to by the FTC4 controller.

### <How to check read and write operations>

- a) Check for correct wiring of power supply to the system. For more details, refer to section 4.6.  
(Do not power on the system at this point.)
  - b) Insert an SD memory card.
  - c) Power on the system.
  - d) The LED4 lamp lights if the read and write operations are successfully completed. If the LED4 lamp continues blinking or does not light, the SD memory card cannot be read or written to by the FTC4 controller.
- (7) Make sure to follow the instruction and the requirement of the SD memory card's manufacturer.
  - (8) Format the SD memory card if determined unreadable in step (6). This could make it readable.  
Download an SD card formatter from the following site.  
SD Association homepage: <https://www.sdcard.org/home/>
  - (9) FTC4 supports FAT file system but not NTFS file system.
  - (10) Mitsubishi Electric is not liable for any damages, in whole or in part, including failure of writing to an SD memory card, and corruption and loss of the saved data, or the like. Back up saved data as necessary.
  - (11) Do not touch any electronic parts on the FTC4 control board when inserting or ejecting an SD memory card, or else the control board could fail.

### Logos



### Capacities

2 GB to 32 GB \*2

### SD speed classes

All

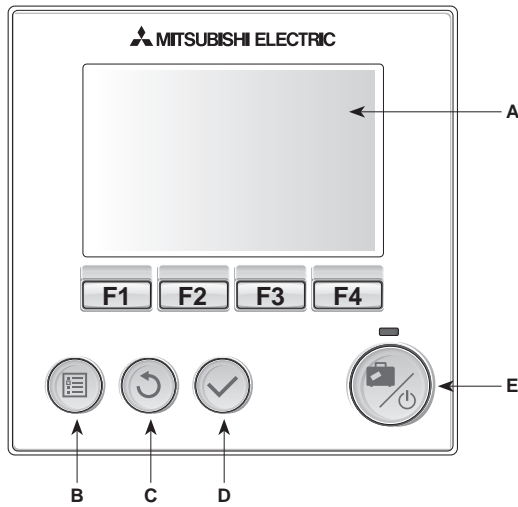
- The SD Logo is a trademark of SD-3C, LLC.  
The miniSD logo is a trademark of SD-3C, LLC.  
The microSD logo is a trademark of SD-3C, LLC.

\*1 To edit main controller settings or to check operating data, an Ecodan service tool (for use with PC) is required.

\*2 A 2-GB SD memory card stores up to 30 days of operation logs.

# 5 System Set Up

## 5.6 Main Controller



### <Main controller parts>

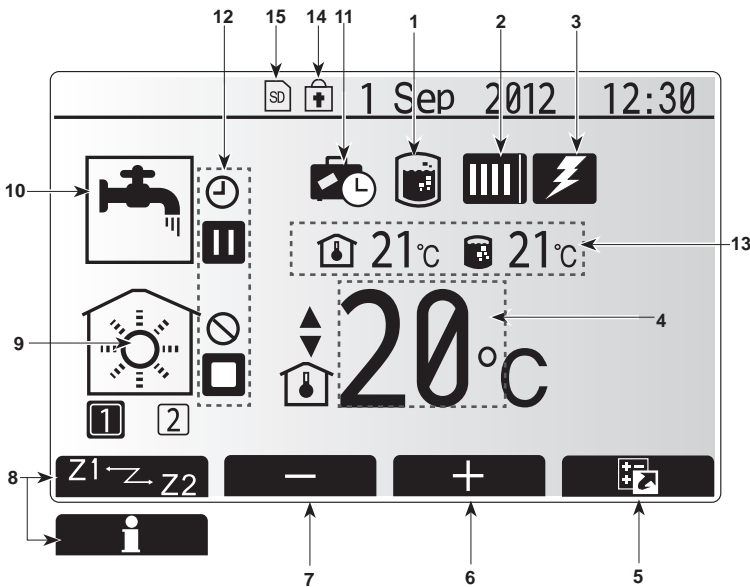
Letter	Name	Function
A	Screen	Screen in which all information is displayed
B	Menu	Access to system settings for initial set up and modifications.
C	Back	Return to previous menu.
D	Confirm	Used to select or save. (Enter key)
E	Power/Holiday	If system is switched off pressing once will turn system on. Pressing again when system is switched on will enable Holiday Mode. Holding the button down for 3 secs will turn the system off. (*1)
F1-4	Function keys	Used to scroll through menu and adjust settings. Function is determined by the menu screen visible on screen A.

\*1

When the system is switched off or the power supply is disconnected, the cylinder unit protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the cylinder unit may potentially become exposed to damage.

### <Main screen icons>

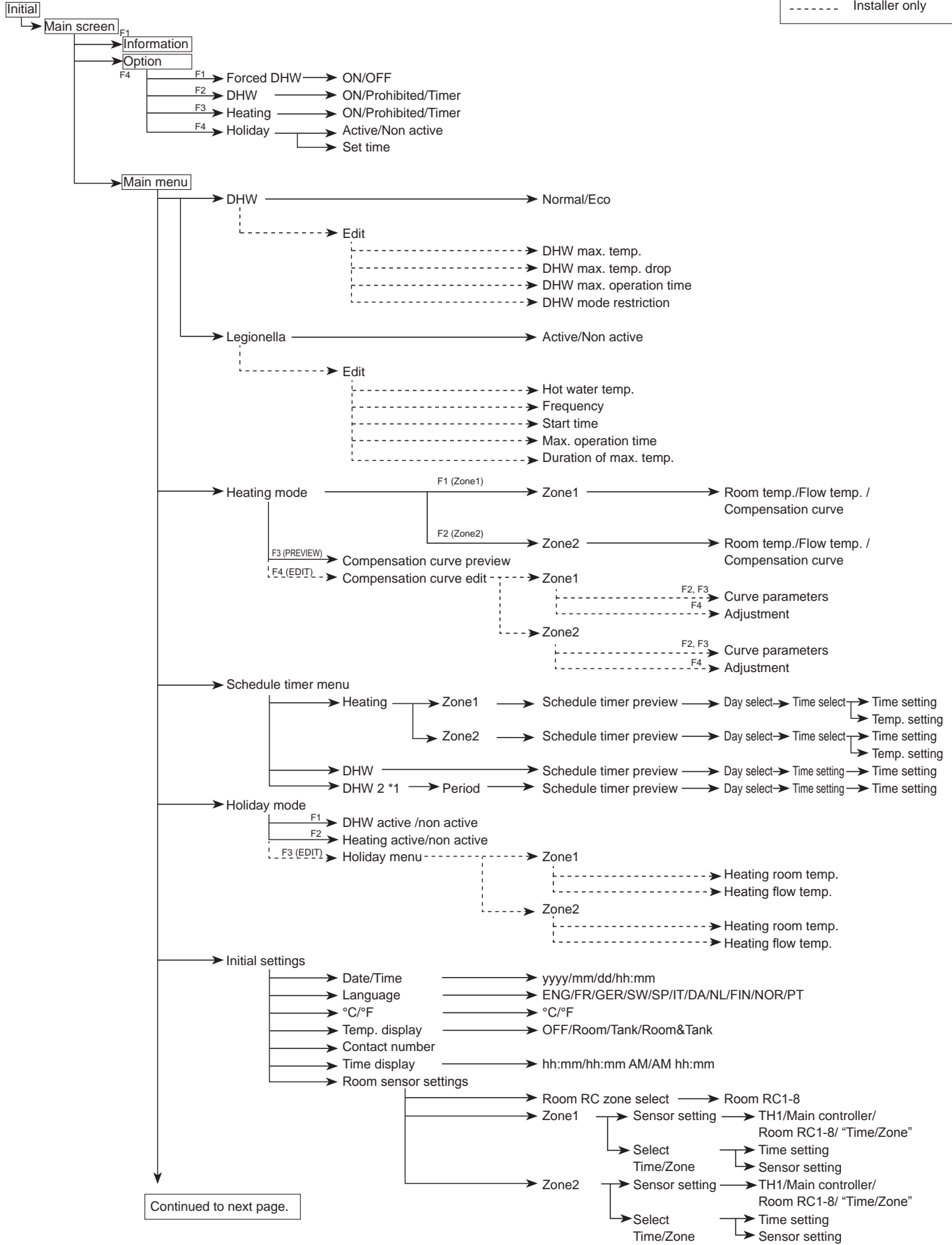
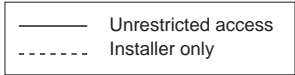
	Icon	Description
1	Legionella prevention	When this icon is displayed 'Legionella prevention mode' is active.
2	Heat pump	'Heat pump' is running.
		Defrosting.
		Emergency heating.
3	Electric heater	When this icon is displayed the 'Electric heaters' (booster or immersion heater) are in use.
4	Target temperature	Target flow temperature
		Target room temperature
		Compensation curve
5	OPTION	Pressing the function button below this icon will display the quick view menu.
6	+	Increase desired temperature.
7	-	Decrease desired temperature.
8	Z1 Z2	Pressing the function button below this icon switches between Zone1 and Zone2.
		Information
9	Space heating mode	Heating mode Zone1 or Zone2
10	DHW mode	Normal or ECO mode
11	Holiday mode	When this icon is displayed 'Holiday mode' activated.
12		Timer
		Prohibited
		Stand-by
		Stop
		Operating
13	Current temperature	Current room temperature
		Current water temperature of DHW tank
14		The Menu button is locked or the switching of the operation modes between DHW and Heating operations are disabled in the Option screen.
15		SD memory card is inserted. Normal operation.
		SD memory card is inserted. Abnormal operation.



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# 5 System Set Up

## <Main Controller Menu Tree>

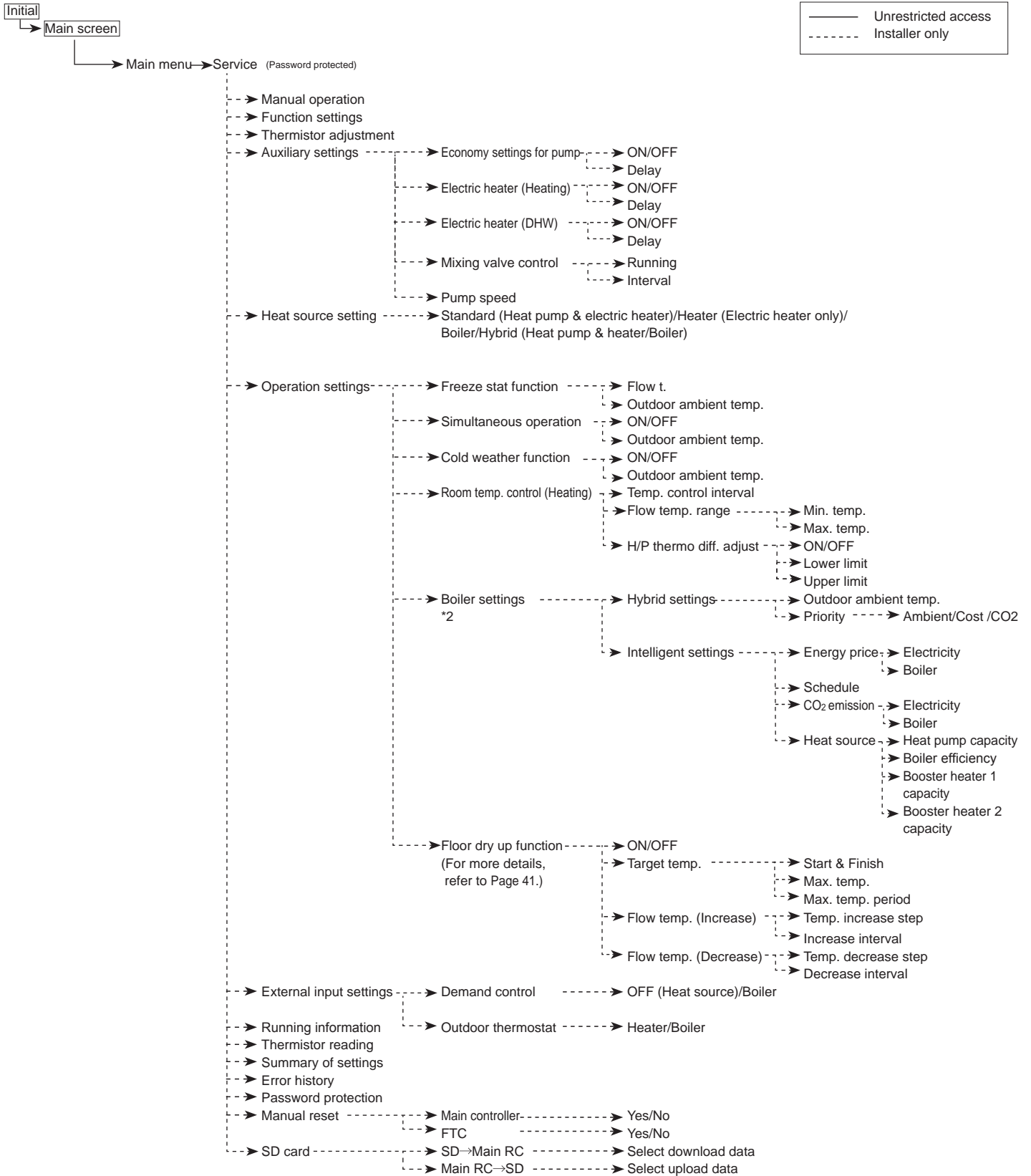


Continued to next page.

\*1 When a PUHZ-FRP outdoor unit is connected.

# 5 System Set Up

## <Main Controller Menu Tree>



\*2 For more details, refer to the installation manual of PAC-TH011HT-E.

Continued from the previous page.

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# 5 System Set Up

## Setting the Main Controller

After the power has been connected to the outdoor and cylinder units (See chapter 4.6) the initial system settings can be entered via the main controller.

1. Check all breakers and other safety devices are correctly installed and turn on power to the system.
2. When the main controller switched on for the first time, the screen automatically goes to Initial settings menu, Language setting screen and Date/Time setting screen in order.
3. Main controller will automatically start up. Wait approximately 6 mins whilst the control menus load.
4. When the controller is ready a blank screen with a line running across the top will be displayed.
5. Press button E (Power) (refer to page 28) to turn on the system. Before turning on the system, perform initial settings as instructed below.



## Main Settings Menu

The main settings menu can be accessed by pressing the MENU button. To reduce the risk of untrained end users altering the settings accidentally there are two access levels to the main settings; and the service section menu is password protected.

### User Level – Short press

If the MENU button is pressed once for a short time the main settings will be displayed but without the edit function. This will enable the user to view current settings but **NOT** change the parameters.

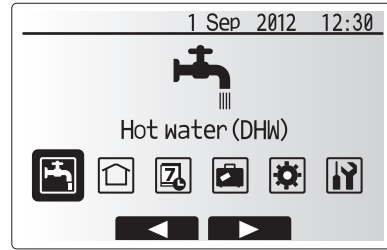
### Installer Level – Long press

If the MENU button is pressed down for 3 secs the main settings will be displayed with all functionality available.

The following items can be viewed and/or edited (dependent on access level).

- Domestic Hot water (DHW)
- Heating
- Schedule timer
- Holiday mode
- Initial settings
- Service (Password protected)

Use the F2 and F3 buttons to move between the icons. The highlighted icon will appear as a larger version in the centre of the screen. Press CONFIRM to select and edit the highlighted mode.



Icon	Description
	Hot water (DHW)
	Heating
	Schedule timer
	Holiday mode
	Initial settings
	Service

## Initial Settings

From the Initial settings menu the installer can set the following.

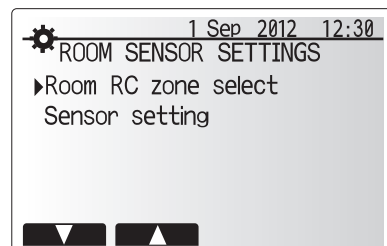
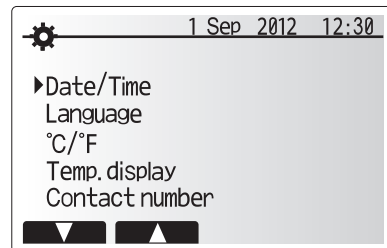
- Date/Time
- Language
- °C/°F
- Temp. display
- Contact number
- Time display
- Room sensor settings

1. Use buttons F1 and F2 to move scroll through the menu list. When the title is highlighted press CONFIRM to edit.
2. Use function buttons appropriate to edit each setting then press CONFIRM to save the setting.

### <Room sensor settings>

For room sensor settings it is important to choose the correct room sensor depending on the heating mode the system will operate in.

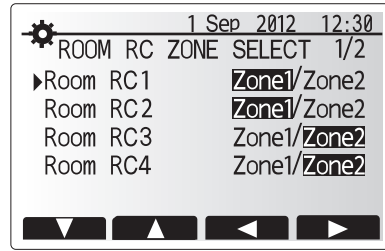
1. From the Initial settings menu select Room sensor settings.





# 5 System Set Up

2. When 2-zone temperature control is active or wireless remote controllers are available, from Room RC zone select screen, select zone no. to assign to each remote controller.

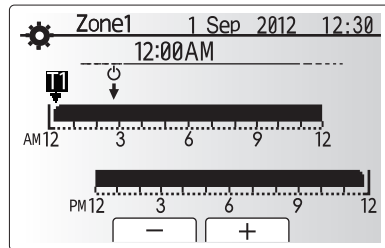
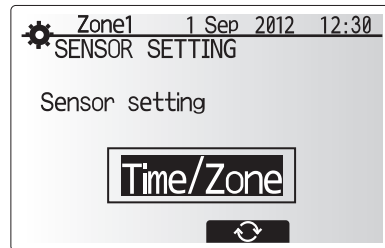
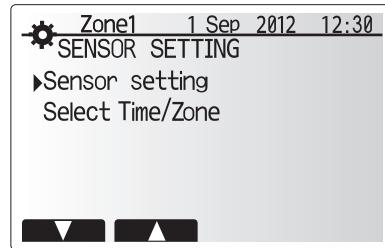


3. From Sensor setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately.

Control option (pages 24 and 25)	Corresponding initial settings room sensor	
	Zone1	Zone2
A	Room RC1-8 (one each for Zone1 and Zone2)	*
B	TH1	*
C	Main controller	*
D	*	*

\* Not specified ( if a field-supplied room thermostat is used)  
Room RC1-8 (one each for Zone1 and Zone2) (if a wireless remote controller is used as a room thermostat)

4. From Sensor setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone menu. The room sensors can be switched up to 4 times within 24 hours .



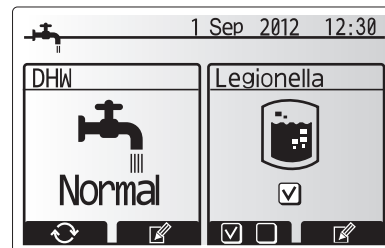
Time/Zone schedule setting screen

## Domestic Hot Water (DHW)/Legionella Prevention

The domestic hot water and legionella prevention menus control the operation of DHW tank heat ups.

### <DHW mode settings>

1. Highlight the hot water icon and press CONFIRM.
2. Use button F1 to switch between Normal and ECO heating modes.
3. To edit the mode press F2 to display the HOT WATER (DHW) SETTING menu.
4. Use F2 and F3 keys to scroll through the menu selecting each component in turn by pressing CONFIRM. See the table below for description of each setting.
5. Enter the desired number using the function keys and press CONFIRM.



Menu subtitle	Function	Range	Unit	Default value
DHW max. temp	Desired temperature of stored hot water	40 - 60	°C	50
DHW max. temperature drop	Difference in temperature between DHW max. temp and the temperature at which DHW mode restarts	5 - 30	°C	10
DHW max. operation time	Max time allowed for stored water heating DHW mode	30 - 120	min	60
DHW mode restriction	The time period after DHW mode when space heating has priority over DHW mode temporarily preventing further stored water heating (Only when DHW max. operation time has passed.)	30 - 120	min	30

GB

# 5 System Set Up

## Explanation of DHW operation

- When the DHW tank temperature drops from "DHW max. temp." by more than the "DHW max. temperature drop" (set by installer), DHW mode operates and the flow from the primary heating circuit is diverted to heat the water in the DHW tank.
- When the temperature of the stored water reaches the 'DHW max. temp.' set by the installer or if the 'DHW max. operation time' set by the installer is exceeded DHW mode ceases to operate.
- Whilst DHW mode is in operation primary hot water is not directed to the space heating circuit.
- Directly after DHW max. operation time 'DHW mode restriction' will routinely operate. The duration of this feature is set by the installer and during its operation DHW mode can not (normally) be reactivated, allowing time for the system to deliver primary hot water to the space heating if required. However, if at this time there is no current demand for space heating, the system will automatically resume DHW mode. This will continue until it receives a demand for space heating.
- After the 'DHW mode restriction' operation the DHW mode can operate again and DHW tank heating will continue according to system demand.

### <Eco mode>

DHW mode can run in either 'Normal' or 'Eco' mode. Normal mode will heat the water in the DHW tank more quickly using the full power of the heat pump. Eco mode takes a little longer to heat the water in the DHW tank but the energy used is reduced. This is because heat pump operation is restricted using signals from the FTC4 based on measured DHW tank temperature.

**Note: The actual energy saved in Eco mode will vary according to outdoor ambient temperature.**

Return to the DHW/legionella prevention menu.

## Legionella Prevention Mode settings (LP mode)

1. Use button F3 to choose legionella mode active YES/NO.
2. Use button F4 to edit the legionella function.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.

During Legionella Prevention Mode the temperature of the stored water is increased above 60°C to inhibit legionella bacterium growth. It is strongly recommended that this is done at regular intervals. Please check local regulations for the recommended frequency of heat ups.

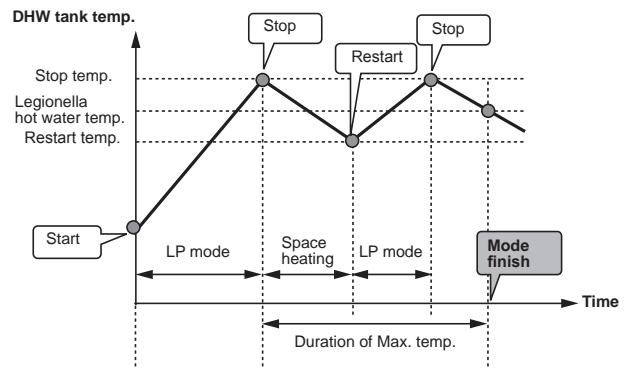
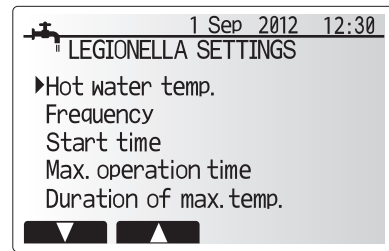
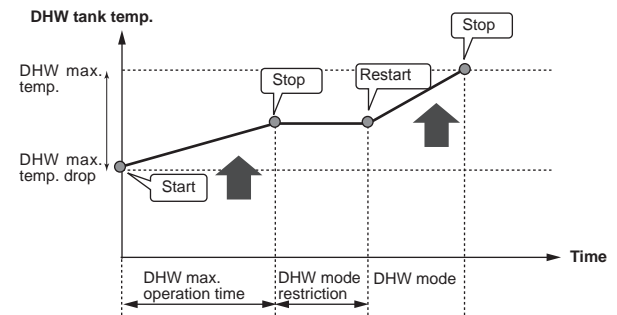
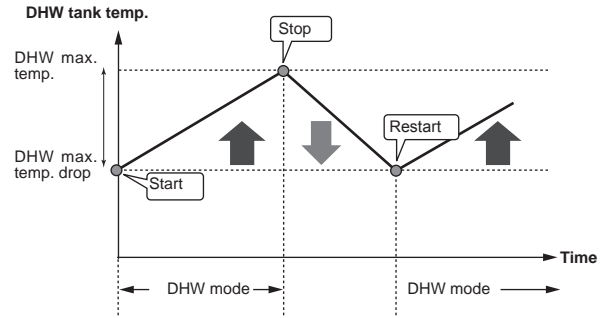
**Note: When failures occur on the cylinder unit, the LP mode may not function normally.**

Menu subtitle	Function	Range	Unit	Default value
Hot water temp.	Desired temp of stored hot water	60 - 70	°C	65
Frequency	Time between LP mode DHW tank heat ups	1 - 30	day	15
Start time	Time when LP mode will begin	0:00 - 23:00	-	03:00
Max. operation time	Maximum time allowed for LP mode DHW tank heat	1 - 5	hour	3
Duration of max. temp.	The time period after LP mode max. water temp has been reached	1 - 120	min	30

## Explanation of Legionella Prevention Mode operation

- At the time entered by the installer 'Start time' flow of useful heat from the system is diverted to heat the water in the DHW tank.
- When the temperature of the stored water exceeds the 'Hot Water temp.' set by the installer (above 65°C) primary circuit water is no longer diverted to heat the DHW tank.
- Whilst LP mode is in operation hot water is not directed to the space heating circuit.
- Directly after LP mode operation 'Duration of max. temp' will operate. The duration of this feature is set by the installer and during its operation stored water temperature will be monitored.
- If stored water temperature should drop to LP restart temp, LP mode will restart and primary water flow from the heat source(s) will be directed to the DHW tank to boost the temperature. Once the set time for Duration of Max. temp has passed LP mode will not recur for the set interval (set by installer).
- It is the responsibility of the installer to ensure the settings for legionella prevention are compliant with local and national guidelines.

Please note that LP mode uses the assistance of electric heaters (if present) to supplement the energy input of the heat pump. Heating water for long periods of time is not efficient and will increase running costs. The installer should give careful consideration to the necessity of legionella prevention treatment whilst not wasting energy by heating the stored water for excessive time periods. The end user should understand the importance of this feature. **ALWAYS COMPLY WITH LOCAL AND NATIONAL GUIDANCE FOR YOUR COUNTRY REGARDING LEGIONELLA PREVENTION.**



(LP mode: Legionella Prevention mode)

# 5 System Set Up

## Forced DHW

The forced DHW function is used to force the system to operate in DHW mode. In normal operation the water in the DHW tank will be heated either to the set temperature or for the maximum DHW time, whichever occurs first. However should there be a high demand for hot water 'Forced DHW' function can be used to prevent the system from routinely switching to space heating and continue to provide DHW tank heating.

Forced DHW operation is activated by pressing button F1 and Back button in the 'Option Screen'. After DHW operation finishes, the system will automatically return to normal operation. To cancel forced DHW operation hold down button F1 in the 'Option Screen'.

## ■ Heating

The heating menu deals with space heating typically using either a radiator or under-floor system depending on the installation.

From the main settings menu

1. Use F2 and F3 buttons to highlight heating icon then press CONFIRM.
2. The heating menu will be displayed.
3. To select the sub-menus press the function button below the icon required.  
E.g. for mode change of Zone1 press F1

Heating

1. Under this sub-menu the mode of heating is selected.
2. Choose between
  - Flow temperature (🔥)
  - Room temperature (🏠)
  - Compensation curve (📈)
3. To choose between the different modes for heating, highlight the mode preferred and press select.

If compensation curve mode was selected as the heating mode please read the following instructions.

### Explanation of compensation curve

During late spring and summer usually the demand for space heating is reduced. To prevent the heat pump from producing excessive flow temperatures for the primary circuit the compensation curve mode can be used to maximise efficiency and reduce running costs.

The compensation curve is used to restrict the flow temperature of the primary space heating circuit dependent on the outdoor ambient temperature. The FTC4 uses information from both an outdoor ambient temperature sensor and a temperature sensor on the primary circuit supply to ensure the heat pump is not producing excessive flow temperatures if the weather conditions do not require it.

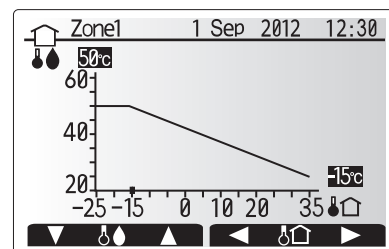
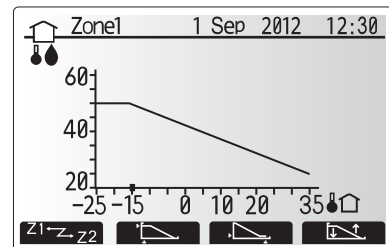
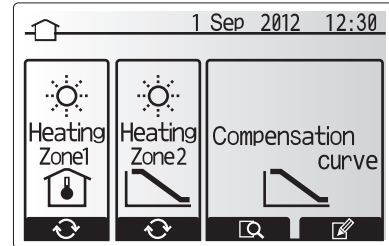
### <Compensation curve setting>

1. From the heating menu select edit using the F3 function button.
2. The compensation curve setting screen will be displayed.
3. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2.
4. Press F2 to alter the Hi parameter (when flow temp is maximum and outdoor ambient temp is minimum).
5. Press F3 to alter the Lo parameter (when flow temp is minimum and outdoor ambient temp is maximum).
6. Press F4 to add an extra point (adjust).

Pressing F2-4 will cause the relevant edit screen to be displayed. Editing Lo and Hi parameters is done in the same way; please see the following for more detailed explanation of parameter editing.

In the parameter (Lo/Hi) edit screen the flow temperature and outdoor ambient temperature for the compensation curve graph can be set and altered for the 2 extremes of Hi and Lo.

1. Press F1 and F2 to change the flow temperature (y-axis of compensation curve).
2. Pressing F1 will raise the desired flow temperature for the set outdoor ambient temperature.
3. Pressing F2 will lower the desired flow temperature for the set outdoor ambient temperature.
4. Press F3 and F4 to change the outdoor ambient temperature (x-axis of compensation curve).
5. Pressing F3 will lower the outdoor ambient temperature for the set flow temperature.
6. Pressing F4 will raise the outdoor ambient temperature for the set flow temperature.



# 5 System Set Up

## ■ Holiday mode

Holiday mode can be activated in 2 ways. Both methods will result in the Holiday Mode activation screen being shown.

### Option 1.

From the main menu screen button E should be pressed. Be careful not to hold down button E for too long as this will turn off the controller and system.

### Option 2.

From the main menu screen press button F4. The current settings screen will be displayed. Press button F4 again to access the holiday mode activation screen.

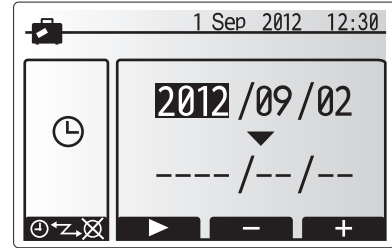
Once the holiday mode activation screen is displayed you can activate/deactivate and select the duration that you would like holiday mode to run for.

- Press button F1 to activate or deactivate holiday mode.
- Use buttons F2, F3 and F4 to input the date which you would like holiday mode to activate or deactivate for space heating.

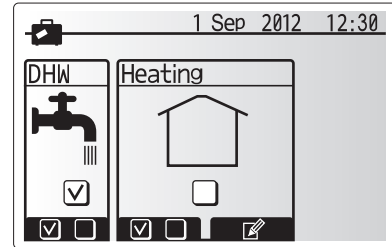
### <Editing holiday mode>

To change the Holiday mode settings e.g. the flow temp, you must access the holiday mode menu from the main settings menu.

1. From main menu screen press button B.
2. Use buttons F2 and F3 to scroll through menu until Holiday Mode is highlighted.
3. Press CONFIRM button.
4. The holiday mode status screen is displayed.
5. To change the flow temperature or room temperatures on heating mode press button F3.
6. A list of variables will be displayed. Choose the one you wish to modify using buttons F1/F2 then press CONFIRM.
7. Adjust the temperature using buttons F3 and F2 and press CONFIRM button to save changes.



Holiday Mode activation screen



Holiday Mode status screen

## ■ Schedule timer

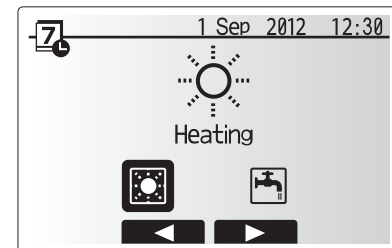
The schedule timer mode allows daily and weekly space heating and DHW patterns to be entered.

1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
  - Heating
  - Hot Water (DHW)
3. Use F2 and F3 buttons to move between mode icons then press CONFIRM to be shown the preview screen for each mode.

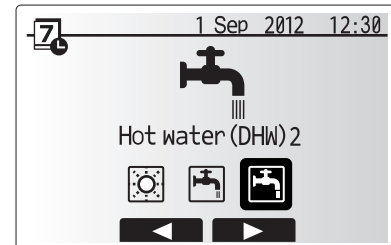
The preview screen allows you to view the current settings. In 2-zone heating operation, press F1 to switch between Zone1 and Zone2. Days of the week are displayed across the top of the screen. Where day appears underlined the settings are the same for all those days underlined. Hours of the day and night are represented as a bar across the main part of the screen. Where the bar is solid black, space heating/DHW (whichever is selected) is allowed.

When a PUAZ-FRP outdoor unit is connected, DHW schedule timer setting can be set for two periods into which a year is divided. In this menu screen, the duration of Period 2 can be entered. The rest of the set duration comes set as Period 1.

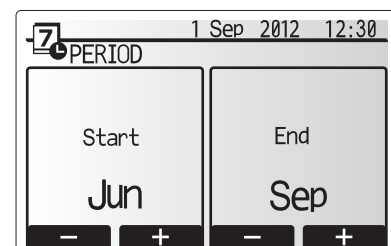
1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
  - Heating
  - Hot Water (DHW)
  - Hot Water (DHW) 2
3. Use F2 and F3 buttons to move between mode icons to select the Hot Water (DHW) 2 icon.
4. Use F1 to F4 buttons to select start and end months that apply to Period 2.
5. Press CONFIRM to be shown the preview screen for each mode.



Mode select screen



Mode select screen when PUAZ-FRP connected

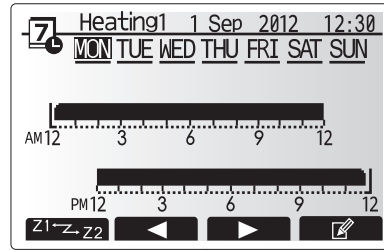


Period setting screen when PUAZ-FRP connected

# 5 System Set Up

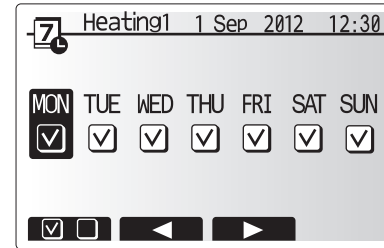
## <Setting the schedule timer>

1. In the preview menu screen press F4 button.



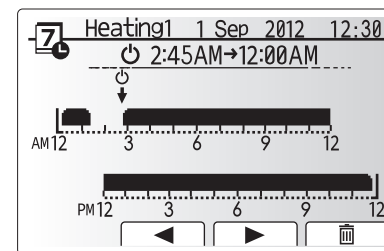
Preview screen

2. First select the days of the week you wish to schedule.
3. Press F2/F3 buttons to move between days and F1 to check or uncheck the box.
4. When you have selected the days press CONFIRM.



Day of week select screen

5. The time bar edit screen will be displayed.
6. Use buttons F2/F3 to move to the point at which you do not want the selected mode to be active press CONFIRM to start.
7. Use F3 button to set the required time of inactivity then press CONFIRM.
8. You can add up to 4 periods of inactivity within a 24 hour interval.



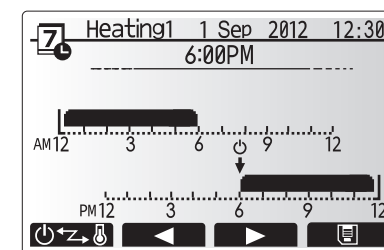
Time of period setting screen 1

9. Press F4 to save settings.

When scheduling heating, button F1 changes the scheduled variable between time and temperature. This enables a lower temperature to be set for a number of hours e.g. a lower temperature may be required at night when the occupants are sleeping.

### Note:

- The schedule timer for space heating and DHW are set in the same way. However for DHW only time can be used as scheduling variable.
- A small rubbish bin character is also displayed choosing this icon will delete the last unsaved action.
- It is necessary to use the SAVE function F4 button to save settings. CONFIRM does NOT act as SAVE for this menu.



Time of period setting screen 2

## 5 System Set Up

### ■ Service Menu

The service menu provides functions for use by installer or service engineer. It is NOT intended the home owner alters settings within this menu. It is for this reason password protection is required to prevent unauthorised access to the service settings.

1. From the main setting menu use F2 and F3 to highlight the service icon then press CONFIRM.
2. You will be prompted to enter a password. **THE FACTORY DEFAULT PASSWORD IS "0000"**.
3. Press CONFIRM.  
(It takes approx. 30 secs to load the service menu.)

The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across two screens and is comprised of the following functions;

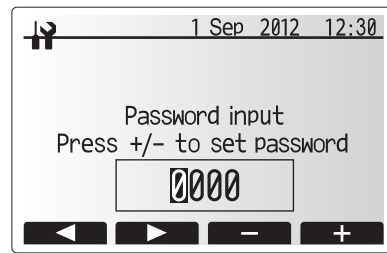
1. Manual operation
2. Function settings
3. Thermistor adjustment
4. Auxiliary settings
5. Heat source setting
6. Operation settings
7. External input settings
8. Running information
9. Thermistor reading
10. Summary of settings
11. Error history
12. Password protection
13. Manual reset
14. SD card

In this Installation Manual, instructions will be given only for the following functions;

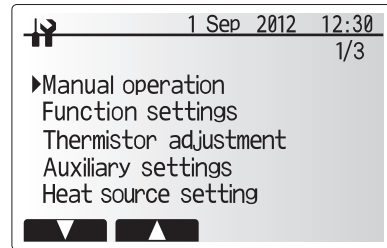
1. Manual operation
2. Auxiliary settings
3. Heat source setting
4. Operation settings
5. External input settings
6. Password protection
7. Manual reset
8. SD card

Information on the other functions can be found by consulting the service manual.

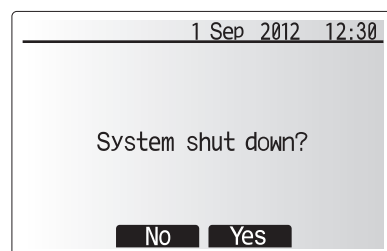
**Note: Many functions can not be set whilst the indoor unit is running. The installer should turn OFF the unit before trying to set these functions. If the installer attempts to change the settings whilst the unit is running the main controller will display a reminder message prompting the installer to stop operation before continuing. By selecting "Yes" the unit will cease operation.**



Screen 1 of service menu



Screen 2 of service menu



System off prompt screen

# 5 System Set Up

## Manual operation

During the filling of the system the water circulation pump and 3-way valve can be manually overridden using manual operation mode. When manual operation is selected a small timer icon appears in the screen. The function selected will only remain in manual operation for a maximum of 2 hours. This is to prevent accidental permanent override of the FTC4.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Operation is highlighted.
2. Press CONFIRM.
3. Manual operation menu screen is displayed.
4. To activate manual operation press the function button under the desired part.

### ►Example

Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the DHW tank is complete the installer should access this menu again and press F3 to deactivate manual operation of the part. Alternatively after 2 hours manual operation mode will no longer be active and FTC4 will resume control of the part.

**NOTE: Manual operation and heat source setting can not be selected if the system is running. A screen will be displayed asking the installer to stop the system before these modes can be activated. The system automatically stops 2 hours after last operation.**

## Auxiliary settings

This function is used to set the parameters for any auxiliary parts used in the system.

From the service menu use F1 and F2 buttons to highlight Auxiliary settings then press CONFIRM.

### <Economy settings for pump>

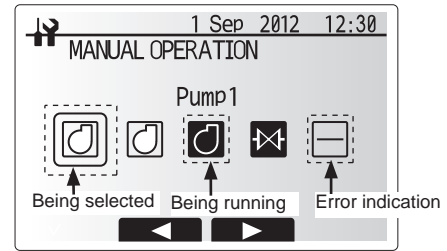
1. From the Auxiliary settings menu highlight Economy Settings for water circulation pump.
2. Press CONFIRM.
3. The economy settings for water circulation pump screen is displayed.
4. Use button F1 to switch the water circulation pump ON/OFF.
5. Use buttons F3 and F4 to adjust the time the water circulation pump will run. (3 - 60 mins)

### <Electric heater (Heating)>

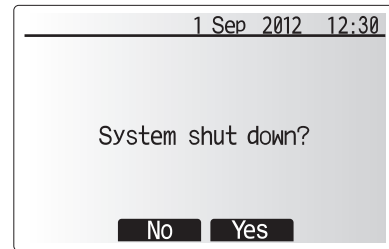
1. From the Auxiliary settings menu highlight Electric heater (Heating).
2. Press CONFIRM.
3. The Electric heater (Heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater will assist in space heating. (5 -180mins)

### <Electric heater (DHW)>

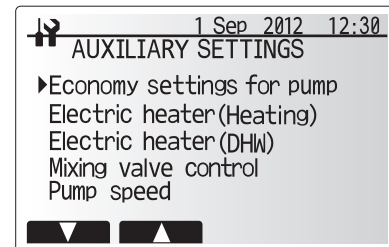
1. From the Auxiliary settings menu highlight Electric heater (DHW).
2. Press CONFIRM.
3. The Electric heater (DHW) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating. (15 -30mins)



Manual operation menu screen



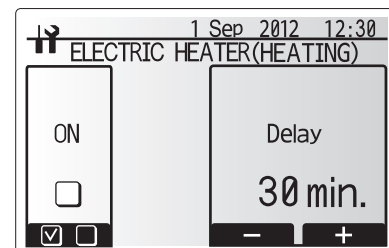
System off prompt screen



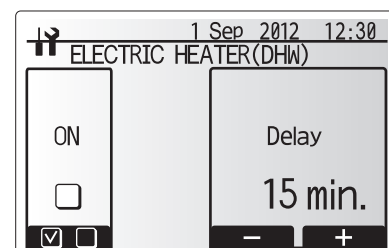
Auxiliary settings menu screen



Economy settings for pump screen



Electric heater (Heating) screen



Electric heater (DHW) screen



# 5 System Set Up

## <Mixing valve control>

1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Use F1 and F2 buttons to set Running time between 30 to 240 seconds. The Running time equals to a period from full open of the valve (at a hot water mixing ratio of 100%) to full close (at a cold water mixing ratio of 100%).

**Note: Set the Running time according to the specifications of the actuator of each mixing valve.**

1. From the Auxiliary settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Press F3 and F4 buttons to set the interval between 2-zone temperature controls of the mixing valve between 1 to 30 mins.

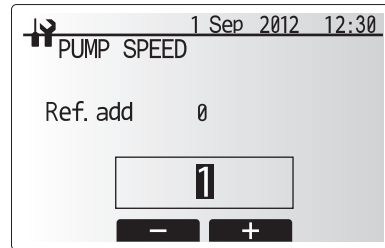
**Note: It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.**



Mixing valve control setting screen

## <Pump speed>

1. From the Auxiliary settings menu highlight water circulation pump speed.
2. Press CONFIRM.
3. Press F3 and F4 buttons to select a refrigerant address of which you wish to configure or check the settings.
4. Press CONFIRM.
5. The Pump speed screen is displayed.
6. Use F2 and F3 buttons to set the pump speed of the water circulation pump between 1 to 5.



Pump speed setting screen

## Heat source setting

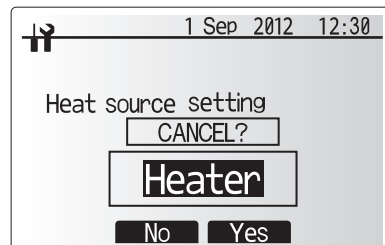
The default heat source setting is heat pump and all electric heaters present in the system to be operational. This is referred to as Standard operation on the menu.

1. From the service menu use F1 and F2 buttons to scroll through list until *Heat Source Setting* is highlighted.
2. Press CONFIRM.
3. Heat source setting menu screen is displayed.
4. Press F3 button until preferred heat source is displayed.
5. Press CONFIRM.



Heat source setting screen

6. If you wish to return to the service menu without saving the setting press return button. You will be asked if you are sure you wish to cancel the changes. Choose Yes or No as appropriate.

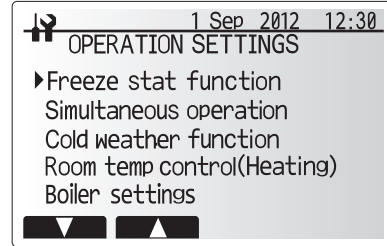


Cancel last action screen

# 5 System Set Up

## Operation settings

1. To access the Operation settings menu use F1 and F2 buttons to scroll through the service menu until Operation settings is highlighted.
2. Press CONFIRM.
3. Operation settings menu is displayed.

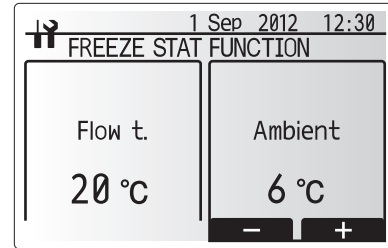


Operation settings menu screen

### <Freeze stat function>

1. From the Auxiliary settings menu highlight Freeze Stat Function.
2. Press CONFIRM.
3. The freeze stat function screen will be displayed.
4. Use buttons F3 and F4 to adjust the minimum outdoor ambient temperature which freeze stat function will begin to operate, (3 - 20 °C) or choose \*. If asterisk (\*) is chosen freeze stat function is deactivated. (i.e. primary water freeze risk)

**Note: When the system is turned off, freeze stat function is not enabled.**



Freeze stat function screen

### <Simultaneous Operation>

For periods of very low outside temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump and/or booster heater to provide space heating whilst only the immersion heater provides heating for DHW. This operation is only available if BOTH a DHW tank AND immersion heater are present on the system.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Simultaneous operation is highlighted.
2. Press CONFIRM.
3. Simultaneous operation screen is displayed.
4. To switch simultaneous operation ON/OFF press F1.
5. To alter the temperature at which simultaneous operation starts use F3 and F4.

#### Note:

- Range of outdoor ambient temperature is  $-15^{\circ}\text{C}$  to  $10^{\circ}\text{C}$  (default  $-15^{\circ}\text{C}$ ).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.

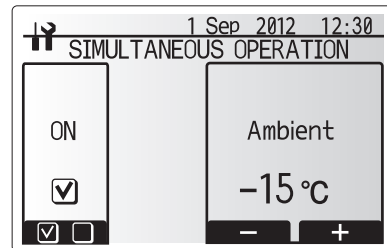
### <Cold weather function>

For extremely low outdoor ambient temperature conditions when the heat pump's capacity is restricted the heating or DHW is provided only by the electric booster heater (and immersion if present). This function is intended for use during extreme cold periods only. Extensive use of direct electrical heaters ONLY will result in higher electric usage and may reduce working life of heaters and related parts.

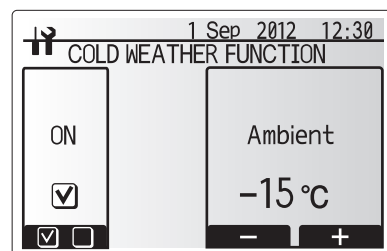
1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Cold weather function is highlighted.
2. Press CONFIRM.
3. Cold weather function screen is displayed.
4. To switch Cold weather function ON/OFF press F1.
5. To alter the temperature at which heater switching function starts use F3 and F4.

#### Note:

- Range of outdoor ambient temperature is  $-15^{\circ}\text{C}$  to  $-10^{\circ}\text{C}$  (default  $-15^{\circ}\text{C}$ ).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.



Simultaneous operation screen



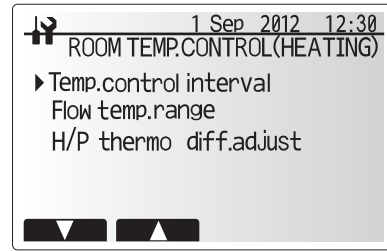
Cold weather function screen

# 5 System Set Up

## <Room Temp Control (Heating)>

This function allows operational setting of flow temperature range from the Ecodan and also the time interval at which the FTC4 collects and processes data for the auto adaptation mode.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Room temp. control (HEATING) is highlighted.
2. Press CONFIRM.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.



Room temp. control (HEATING) screen

Menu subtitle	Function	Range	Unit	Default	
Temp. control interval	Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.)	10 - 60	mins.	10	
Flow temperature range	Minimum temp.	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	25 - 45	°C	30
	Maximum temp.	To set max. possible flow temp according to the type of heat emitters.	35 - 60	°C	50
Heat pump thermo diff.adjust	On/Off	To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons.	On/Off	—	On
	Lower limit	Prohibits heat pump operation until the flow temperature drops below the target flow temperature minus lower limit value.	-9 - -1	°C	-5
	Upper limit	Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value.	+3 - +5	°C	+5

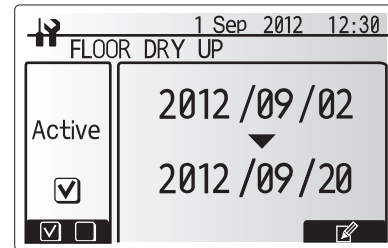
\*1 The minimum flow temperature that prohibits heat pump operation is 20°C.

\*2 The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the flow temp. range menu.

## <Floor dry up function>

The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

1. Turn off the system using the main controller.
2. From the Operation settings in the service menu, use F1 and F2 buttons to scroll through the list until Floor dry up function is highlighted.
3. Press CONFIRM to display the FLOOR DRY UP screen.
4. To change settings, press F4. For details on settings, refer to the table below.
5. To start the Floor dry up operation, press F1 button to check a box below

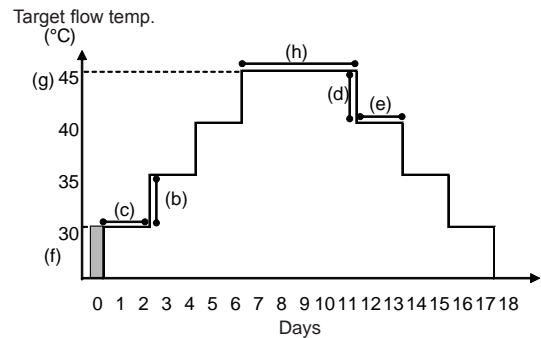


\*1. Upon completion of the operation the system stops all the operations except the Freeze stat. operation.

\*2. For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

### Note:

- This function is not available when a PUAZ-FRP outdoor unit is connected.
- Disconnect wiring to external inputs of room thermostat, demand control, and outdoor thermostat, or the target flow temp. may not be maintained.



Functions	Symbol	Description	Option/Range	Unit	Default	
Floor dry up function	a	Set the function to ON and power on the system using the main controller, and the dry up heating operation will start.	On/Off	—	Off	
Flow temp. (increase)	Flow temp. increase step	b	Sets the increase step of the target flow temp.	+1 - +10	°C	+5
	Increase interval	c	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Flow temp. (decrease)	Flow temp. decrease step	d	Sets the decrease step of the target flow temp.	-1 - -10	°C	-5
	Decrease interval	e	Sets the period for which the same target flow temp is maintained.	1 - 7	day	2
Target temperature	Start & Finish	f	Sets the target flow temp. at the start and the finish of the operation.	25 - 60	°C	30
	Max. target temp.	g	Sets the maximum target flow temp.	25 - 60	°C	45
	Max. temp. period	h	Sets the period for which the maximum target flow temp. is maintained.	1 - 20	day	5

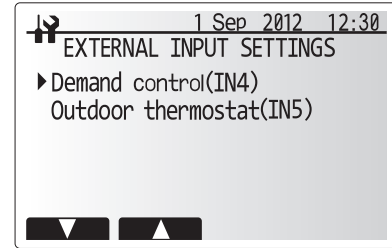
# 5 System Set Up

## External input settings

From the service menu use F1 and F2 buttons to highlight External input settings then press CONFIRM.

### <Demand control (IN4)>

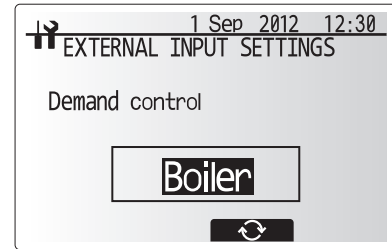
1. From the External input settings menu highlight Demand control (IN4).
2. Press CONFIRM.
3. The Demand control screen is displayed.



External input settings menu screen

4. Press F3 button to select Heat source OFF or Boiler.
5. Press CONFIRM.

**Note:** The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.

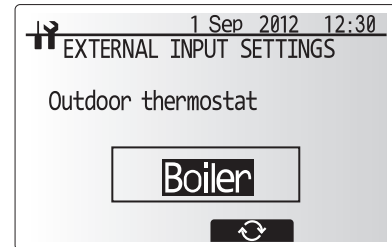


Demand control screen

### <Outdoor thermostat (IN5)>

1. From the External input settings menu highlight Outdoor thermostat (IN5).
2. Press CONFIRM.
3. The Outdoor thermostat screen is displayed.
4. Press F3 button to select Heater or Boiler.
5. Press CONFIRM.

**Note:** The selection of "Heater", whilst a signal is being sent to IN5, performs electric-heater-only operation and the selection of "Boiler" performs boiler operation.



Outdoor thermostat setting screen

## Password protection

Password protection is available to prevent unauthorised access to the service menu by untrained persons.

1. From the service menu use F1 and F2 buttons to scroll through list until *Password protection* is highlighted.
2. Press CONFIRM.
3. When password input screen is displayed use buttons F1 and F2 to move left and right between the four digits, F3 to lower the selected digit by 1, and F4 to increase the selected digit by 1.
4. When you have input your password press CONFIRM.



Password input screen

5. The password verify screen is displayed.
6. To verify your new password press button F3.
7. Your password is now set and the completion screen is displayed.



Password verify screen

### <Resetting the password>

If you forget the password you entered, or have to service a unit somebody else installed, you can reset the password to the factory default of **0000**.

1. From the main settings menu scroll down the functions until Service Menu is highlighted.
2. Press CONFIRM.
3. You will be prompted to enter a password.
4. Hold down buttons F3 and F4 together for 3 secs
5. You will be asked if you wish to continue and reset the password to default setting.
6. To reset press button F3.
7. The password is now reset to **0000**.



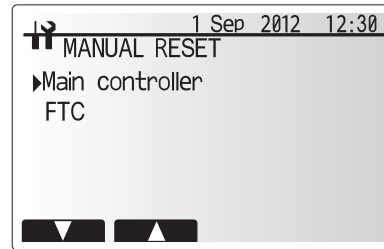
Completion screen

# 5 System Set Up

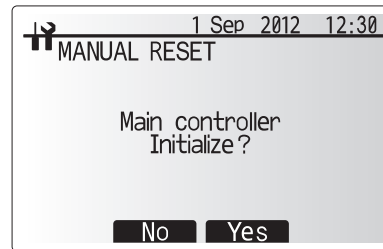
## Manual reset

Should you wish to restore the factory settings at any time you should use the manual reset function. Please note this will reset ALL functions to the factory default settings.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Reset is highlighted.
2. Press CONFIRM.
3. The Manual reset screen is displayed.
4. Choose either Manual Reset for FTC4 or Main Controller.



5. Press F3 button to confirm manual reset of chosen device.



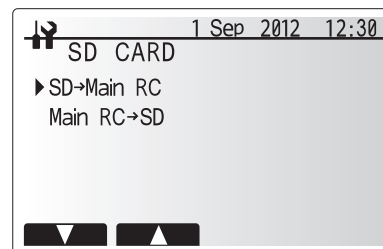
GB

## SD card

The use of an SD memory card simplifies the main controller settings in the field.  
\*Ecodan service tool (for use with PC tool) is necessary for the setting.

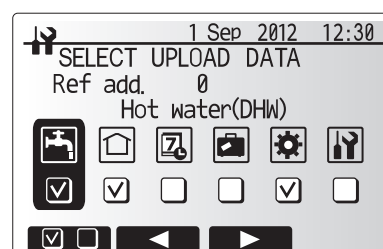
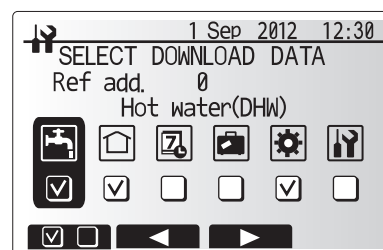
### <SD → Main RC>

1. From the SD card setting use F1 and F2 buttons to scroll through list until "SD → Main RC" is highlighted.
2. Press CONFIRM.
3. Use F1, F2 and F3 buttons to select a menu to write to the main controller.
4. Press CONFIRM to start downloading.
5. Wait for a few minutes until "Complete!" appears.



### <Main RC → SD>

1. From the SD card setting use F1 and F2 buttons to scroll through list until Main RC → SD is highlighted.
2. Press CONFIRM.
3. Use F1, F2 and F3 buttons to select a menu to write to the SD memory card.
4. Press CONFIRM to start uploading.
5. Wait for a few minutes until "Complete!" appears.



# 6 Commissioning

## ■ Pre-commissioning exercises- potable/DHW circuit

Initial fill procedure:

Ensure all pipe joints and fittings are tight and secure.

Open the most distant DHW tap/outlet.

Slowly/gradually open the mains water supply to begin filling unit and DHW pipework.

Allow most distant tap to run free and release/purge residual air from installation.

Close tap/outlet to retain fully charged system.

**Note: When an immersion heater is fitted, do NOT energise the heater until the DHW tank is full of water. Also do NOT energise any immersion heater if any sterilisation chemicals remain in the DHW tank as this will cause premature failure of the heater.**

Initial flush procedure:

Energise system to heat-up cylinder unit contents to a temperature of approx. 30 - 40°C.

Flush/drain the water contents to remove any residue/impurities resulting from the installation works. Use the cylinder unit drain cock to safely discharge the warmed water to drain via a suitable hose.

On completion, close drain cock, re-fill system and resume system commissioning.

## ■ Pre-commissioning Checklist

Before commissioning the cylinder unit system complete the following table to ensure the necessary checks are carried out.

No	System commissioning checklist				Notes
1	Installation location	Air flow around the unit	Outdoor unit	Good/Poor	
2		Maintenance access	Cylinder unit	Good/Poor	
			Outdoor unit	Good/Poor	
3	Water Quality and System Preparation	Water quantity in the primary circuit			L
4	Pipework	Total pipe length	Outdoor to indoor	m	
5		Height difference	Outdoor to indoor	m	
6		System chemically cleansed and flushed		Yes/No	
7		Insulation type and thickness			
8	Electrical wiring	Correct cables used			
9		Electrical maintenance access			Good/Poor
10		Connection of mains power source	Outdoor unit electric cable	Type	
				Size	
			Indoor unit electric cable	Type	
				Size	
11		Connection of control cable			
12	Anti-freeze	Refer to product guidelines. (Also see section 4.2 Note.)			%
13	Check pre-charge in the expansion vessel(s)				Yes/No
14	Pressurise primary heating circuit to 1 bar				Yes/No
15	Release air from system				Yes/No

Outdoor unit (PACKAGE type) operation checklist					
16	Outdoor unit details		Model No.		Serial No.
17	Power source (V)	1ø	L - N		
		3ø	L1 - L2	L2 - L3	L3 - L1
18	Excessive vibration/noise	Compressor		Yes/No	
		Fan		Yes/No	
19	Unit mounted on anti-vibration pads (Tico Pads)			Yes/No	
20	Provision made for condensate removal			Yes/No	

For installation in hard water areas, see advice in section 4.2 General.

Notes/Comments:

# 7 Service and Maintenance

The indoor cylinder unit is UNVENTED. Under UK law\* the system must be serviced **once a year** by a qualified individual. Servicing and maintenance of the outdoor unit should only be done by a Mitsubishi Electric trained technician with relevant qualifications and experience. Any electrical work should be done by a tradesperson with the appropriate electrical qualifications. Any maintenance or

'DIY' fixes done by a non-accredited person could invalidate the Warranty and/or result in damage to the cylinder unit and injury to the person.

\* Building regulations – England & Wales Part G3, Scotland P3, Northern Ireland P5. If outside of the UK please refer to local building regulations regarding un-vented hot water storage.

## Basic Troubleshooting for Cylinder Unit

The following table is to be used as a guide to possible problems. It is not exhaustive and all problems should be investigated by the installer or another competent person. Users should not attempt to repair the system themselves.

At no time should the system be operating with the safety devices by-passed or plugged.

Fault symptom	Possible cause	Solution
Cold water at taps	Scheduled control off period	Check schedule settings and change if necessary.
	All hot water from DHW tank used	Ensure DHW mode is operating and wait for DHW tank to re-heat.
	Heat pump or electric heaters not working	Contact installer.
Heating system does not get up to set temperature.	Prohibit, schedule or holiday mode selected	Check settings and change as appropriate.
	Incorrectly sized radiators	Contact installer.
	The room in which the temperature sensor is located is at a different temperature to the rest of the house.	Reposition the temperature sensor to a more suitable room.
After DHW operation room temperature rises a little.	Battery problem *wireless control only	Check the battery power and replace if flat.
	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW tank into space heating circuit. This is done to prevent the cylinder unit components from overheating. The amount of hot water directed into the space heating circuit is dependent on the type of system and the pipe run between the plate heat exchanger and the cylinder unit.	Normal operation no action necessary.
Heating emitter is hot in the DHW mode. (The room temperature rises.)	The 3-way valve may have foreign objects in it, or hot water may flow to the heating side due to malfunctions.	Contact installer.
Schedule function inhibits the system from operating but the outdoor unit operates.	Freeze stat. function is active.	Normal operation no action necessary.
Pump runs without reason for short time.	Pump jam prevention mechanism to inhibit the build up of scale.	Normal operation no action necessary.
Mechanical noise heard coming from cylinder unit	Heaters switching on/off	Normal operation no action required.
	3-way valve changing position between DHW and heating mode.	Normal operation no action necessary.
Noisy pipework	Air trapped in the system	Try bleeding radiators (if present) If the symptoms persist contact installer.
	Loose pipework	Contact installer.
Water discharges from one of the relief valves	The system has overheated or overpressurised	Switch off power to the heat pump and any immersion heaters then contact installer.
Small amounts of water drip from one of the relief valves.	Dirt may be preventing a tight seal in the valve	Twist the valve cap in the direction indicated until a click is heard. This will release a small amount of water flushing dirt from the valve. Be very careful the water released will be hot. Should the valve continue to drip contact installer as the rubber seal may be damaged and need replacing.
An error code appears in the main controller display.	The indoor or outdoor unit is reporting an abnormal condition	Make a note of the error code number and contact installer.

### <Power failure>

All setting will be saved for 1 week with no power, after 1 week Date/Time ONLY will be saved.

For more details, refer to the service manual.

### <Draining the cylinder unit and its primary heating circuit (local)>

#### WARNING: DRAINED WATER MAY BE VERY HOT

- Before attempting to drain the cylinder unit isolate from the electrical supply to prevent the immersion and booster heaters burning out.
- Isolate cold water feed to DHW tank.
- Attach a hose to the DHW tank drain cock (No. 17 on Figure 3.1 - 3.4). The hose should be able to withstand heat as the draining water could be very hot. The hose should drain to a place lower than the DHW tank bottom to encourage siphoning.  
Open a hot water tap to start draining without a vacuum.
- When the DHW tank is drained close drain cock and hot tap.
- Attach hose to booster heater drain cock and water circuit drain cock (No. 13 and No. 16 on Figure 3.1 - 3.4). The hose should be able to withstand heat as the draining water could be very hot. The hose should drain to a place lower than the booster heater drain cock to encourage siphoning. Open the pump valves and the strainer valves.
- Water remains in the strainer still after the cylinder unit was drained.  
Drain the strainer by removing the strainer cover.



# 7 Service and Maintenance

## ■ Error Codes

Code	Error	Action
L3	Circulation water temperature overheat protection	Flow rate may be reduced check for; <ul style="list-style-type: none"> <li>• Water leakage</li> <li>• Strainer blockage</li> <li>• Water circulation pump function (Error code may display during filling of primary circuit, complete filling and reset error code.)</li> </ul>
L4	DHW tank water temperature overheat protection	Check the immersion heater and it's contactor.
L5	Indoor unit temperature thermistor (THW1, THW2, THW5, THW6, THW7, THW8, THW9) failure	Check resistance across the thermistor.
L6	Circulation water freeze protection	See Action for L3.
L8	Heating operation error	Re-attach any thermistors that have become dislodged.
L9	Low primary circuit flow rate detected by flow switch (flow switches 1, 2, 3)	See Action for L3. If the flow switch itself does not work, replace it. <b>Caution: The pump valves may be hot, please take care.</b>
LC	Boiler circulation water temperature overheat protection	Check if the setting temperature of the Boiler for heating exceeds the restriction. (See the manual of the thermistors "PAC-TH011HT-E") Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> <li>• water leakage,</li> <li>• strainer blockage</li> <li>• water circulation pump function.</li> </ul>
LD	Boiler temperature thermistor (THWB1, THWB2) failure	Check resistance across the thermistor.
LE	Boiler operation error	See Action for L8. Check the status of the boiler.
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced. Check for <ul style="list-style-type: none"> <li>• water leakage</li> <li>• strainer blockage</li> <li>• water circulation pump function.</li> </ul>
LL	Setting errors of Dip switches on FTC4 control board	For boiler operation, check that Dip SW1-1 is set to ON (With Boiler) and Dip SW2-6 is set to ON (With Mixing Tank). For 2-zone temperature control, check Dip SW2-7 is set to ON (2-zone) and Dip SW2-6 is set to ON (With Mixing Tank).
J0	Communication failure between FTC4 and wireless receiver	Check connection cable for damage or loose connections.
P1	Thermistor (Room temp.) (TH1) failure	Check resistance across the thermistor.
P2	Thermistor (Ref. liquid temp.) (TH2) failure	Check resistance across the thermistor.
P6	Anti-freeze protection of plate heat exchanger	See Action for L3. Check for correct amount of refrigerant.
J1 - J8	Communication failure between wireless receiver and wireless remote controller	Check wireless remote controller's battery is not flat. Check the pairing between wireless receiver to wireless remote controller. Test the wireless communication. (See the manual of wireless system)
E0 - E5	Communication failure between main controller and FTC4	Check connection cable for damage or loose connections.
E6 - EF	Communication failure between FTC4 and outdoor unit	Check that the outdoor unit has not been turned off. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
E9	Outdoor unit receives no signal from indoor unit.	Check both units are switched on. Check connection cable for damage or loose connections. Refer to outdoor unit service manual.
U*, F*	Outdoor unit failure	Refer to outdoor unit service manual.

**Note: To cancel error codes please switch system off (Press button E, on Main Controller, for 3 secs).**

# 7 Service and Maintenance

## Annual Maintenance

It is essential that the cylinder unit is serviced at least once a year by a qualified individual any spare parts required should be purchased from Mitsubishi Electric. **NEVER** bypass safety devices or operate the unit without them being fully operational.

### <Annual maintenance points>

Use the Annual Maintenance Log Book as a guide to carrying out the necessary checks on the cylinder unit and outdoor unit.

## Annual Maintenance Log Book

Contractor name		Engineer name	
Site name		Site number	

### Cylinder unit maintenance record sheet

Warranty number		Model number	
		Serial number	

No.	Mechanical	Frequency	Notes
1	Turn OFF water supply, drain DHW tank, remove mesh from strainer clean and replace in strainer. *1		
2	Keep water supply OFF, open hot water taps and check the primary-side expansion vessel charge pressure. Top up if necessary (1 bar).		
3	Keep water supply OFF and check the potable vessel charge pressure. Top up if necessary (3.5 bar).		
4	Keep water supply OFF. In hard water areas de-scaling of the immersion heaters may be required.		
5	Drop the primary/heating system pressure to zero check and if necessary top up the expansion vessel (1 bar). Air valve of expansion vessel is TR-412.		
6	Turn water supply ON, open the pressure relief valve and then the expansion relief valve in turn. Check for unrestricted discharge to the tundish and that the valves reseat correctly. Check there are no blockages in the tundish and associated pipework.		
7	Check and if necessary top up the concentration of anti-freeze/inhibitor (if used in the system).		
8	Top up the primary/heating system using a temporary backflow prevention filling loop and re-pressurise to 1 bar.		
9	Heat system and check pressure does not rise above 3 bar and no water is released from the safety valves.		
10	Release any air from the system.		
11	To check the 3-way valve for inside leaks, confirm that the temperature of the heat emitter does not rise when running the DHW mode.		

Refrigerant models only [except EHPT20 series]		Frequency	Notes
1	Refer to outdoor unit manual.		

Electrical		Frequency	Notes
1	Check condition of cables.		
2	Check rating and fuse fitted on the electricity supply.		

Controller		Frequency	Notes
1	Check field settings against factory recommendations.		
2	Check operation of motorized valves ensure they reseat correctly.		
3	Check battery power of wireless thermostat and replace if necessary.		

Outdoor heat pump unit maintenance record sheet			
Model number		Serial number	

	Mechanical	Frequency	Notes
1	Inspect grill and air inlet for trapped debris/damage.		
2	Check condensate drain provision.		
3	Check integrity of water pipework and insulation.		
4	Check all electrical connections.		
5	Check and record the operation voltage.		

\* Checks should be carried out once a year.

\*1 Be sure to reattach the mesh after washing.

**Note: Within the first couple of months of installation, remove and clean the cylinder unit's strainer plus any that are fitted external to the cylinder unit. This is especially important when installing on an existing system.**

In addition to annual servicing it is necessary to replace or inspect some parts after a certain period of system operation. Please see tables below for detailed instructions. Replacement and inspection of parts should always be done by a competent person with relevant training and qualifications.

### Parts which require regular replacement

Parts	Replace every	Possible failures
Pressure relief valve (PRV) Air vent (Auto/Manual) Drain cock (Primary circuit) Flexible hose Manometer Inlet control group (ICG)*	6 years	Water leakage due to brass/copper corrosion (Dezincification)

\* OPTIONAL PARTS for UK

### Parts which require regular inspection

Parts	Check every	Possible failures
Immersion heater	2 years	Earth leakage causing circuit breaker to activate (Heater is always OFF)
Water circulation pump	20,000 hrs (3 years)	Water circulation pump failure

### Parts which must NOT be reused when servicing

- \* O-ring
- \* Gasket

**Note: Always replace the gasket for pump with a new one at each regular maintenance (every 20,000 hours of use or every 3 years).**

# 7 Service and Maintenance

## ■ Engineers Forms

Should settings be changed from default, please enter and record new setting in 'Field Setting' column. This will ease resetting in the future should the system use change or the circuit board need to be replaced.

### Commissioning/Field settings record sheet

Main controller screen		Parameters	Default setting	Field setting	Notes	
<b>Main</b>	Zone1 heating room temp.		10°C - 30°C	20°C		
	Zone2 heating room temp. *1		10°C - 30°C	20°C		
	Zone1 heating flow temp.		25°C - 60°C	45°C		
	Zone2 heating flow temp. *1		25°C - 60°C	35°C		
	Zone1 heating compensation curve		-9°C - + 9°C	0°C		
	Zone2 heating compensation curve *1		-9°C - + 9°C	0°C		
	Holiday mode		Active/Non active/Set time	—		
<b>Option</b>	Forced DHW operation		On/Off	—		
	DHW		On/Off/Timer	On		
	Heating		On/Off/Timer	On		
	Holiday mode		Active/Non active/Set time	—		
<b>Setting</b>	DHW	Operation mode		Normal/Eco	Normal	
		DHW max. temp.		40°C - 60°C	50°C	
		DHW temp. drop		5°C - 30°C	10°C	
		DHW max. operation time		30 - 120 mins	60 mins	
		DHW mode restriction		30 - 120 mins	30 mins	
	Legionella prevention	Active		Yes/No	Yes	
		Hot water temp.		60°C - 70°C	65°C	
		Frequency		1 - 30 days	15 days	
		Start time		00.00 - 23.00	03.00	
		Max. operation time		1 - 5 hours	3 hours	
		Duration of maximum temp.		1 - 120 mins	30 min	
		Zone1 operation mode		Room temp/Flow temp/Compensation curve	Room temp	
	Zone2 operation mode *1		Room temp/Flow temp/Compensation curve	Compensation curve		
	Compensation curve	Hi set point	Zone1 outdoor ambient temp.		-15°C - +35°C	-15°C
			Zone1 flow temp.		25°C - 60°C	50°C
			Zone2 outdoor ambient temp. *1		-15°C - +35°C	-15°C
			Zone2 flow temp. *1		25°C - 60°C	40°C
		Lo set point	Zone1 outdoor ambient temp.		-15°C - +35°C	35°C
			Zone1 flow temp.		25°C - 60°C	25°C
			Zone2 outdoor ambient temp. *1		-15°C - +35°C	35°C
			Zone2 flow temp.		25°C - 60°C	25°C
		Adjust	Zone1 outdoor ambient temp.		-14°C - +34°C	—
			Zone1 flow temp.		25°C - 60°C	—
			Zone2 outdoor ambient temp. *1		-14°C - +34°C	—
			Zone2 flow temp. *1		25°C - 60°C	—
	Holiday	DHW		Active/Non active	Non active	
		Heating		Active/Non active	Active	
		Zone1 heating room temp.		10°C - 30°C	15°C	
		Zone2 heating room temp. *1		10°C - 30°C	15°C	
		Zone1 heating flow temp.		25°C - 60°C	35°C	
		Zone2 heating flow temp. *1		25°C - 60°C	25°C	
	Initial settings	Language		ENG/FR/GER/SW/SP/IT/DA/NL/FIN/NOR/PT	ENG	
		°C/°F		°C/°F	°C	
Temp. display		Room/DHW tank/Room&DHW tank /Off	Off			
Time display		hh:mm/hh:mm AM/AM hh:mm	hh:mm			
Room sensor settings for Zone1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room sensor settings for Zone2 *1		TH1/Main RC/Room RC1-8/"Time/Zone"	TH1			
Room RC zone select *1		Zone1/Zone2	Zone1			
Service menu	Thermistor adjustment	THW1	-10°C - +10°C	0°C		
		THW2	-10°C - +10°C	0°C		
		THW5	-10°C - +10°C	0°C		
		THW6	-10°C - +10°C	0°C		
		THW7	-10°C - +10°C	0°C		
		THW8	-10°C - +10°C	0°C		
		THW9	-10°C - +10°C	0°C		
		THWB1	-10°C - +10°C	0°C		
	THWB2	-10°C - +10°C	0°C			
	Auxiliary settings	Economy settings for pump.		On/Off *4	On	
		Time before pump switched off (3 - 60 mins) *2			10 mins	
		Electric heater (Heating)		Space heating: On (used)/Off (not used)	On	
		Electric heater (DHW)		Electric heater delay timer (5 - 180 mins)	30 mins	
		DHW		DHW: On (used)/Off (not used)	On	
		Electric heater delay timer (15 - 30 mins)			15 mins	
		Mixing valve control		Running (10 - 240 secs)	120 secs	
	Interval (1 - 30 mins)			2 mins		
Pump speed		Pump speed (1 - 5)	5			

\*1 The settings related to Zone2 can be switched only when Zone2 temperature control is enabled (when Dip SW2-6 and SW 2-7 are ON).

\*2 Decreasing "time before pump switched off" may increase the duration of stand-by in Heating mode.

(Continued to next page.)

# 7 Service and Maintenance

## Engineers Forms

Commissioning/Field settings record sheet (continued from the previous page)

Main controller screen			Parameters	Default setting	Field setting	Notes		
Service menu	Heat source setting	Operation settings	Standard/Heater/Boiler/Hybrid *3	Standard				
		Freeze stat function	Outdoor ambient temp. (3 - 20°C)	5°C				
		Simultaneous operation (DHW/ Heating)	On/Off *4	Off				
			Outdoor ambient temp. (-15 - +10°C)	-15°C				
		Cold weather function	On/Off *4	Off				
			Outdoor ambient temp. (-15 - -10°C)	-15°C				
		Room temp control (Heating)	Temp. control interval (10 - 60 mins)		10 mins			
			Flow temp. range	Min. temp. (25 - 45°C)	30°C			
				Max. temp. (35 - 60°C)	50°C			
			Heat pump thermo diff. adjust	On/Off *4	On			
				Lower limit (-9 - -1°C)	-5°C			
		Upper limit (+3 - +5°C)		5°C				
		Boiler operation	Hybrid settings		Outdoor ambient temp. (-15 - +10°C)	-15°C		
			Priority mode (Ambient/Cost/CO <sub>2</sub> )		Ambient			
			Intelligent settings	Energy price *5	Electricity (0.001 - 999 */kWh)	0.5 */kWh		
				Boiler (0.001 - 999 */kWh)	0.5 */kWh			
			CO <sub>2</sub> emission	Electricity (0.001 - 999 kg -CO <sub>2</sub> /kWh)	0.5 kg -CO <sub>2</sub> /kWh			
				Boiler (0.001 - 999 kg -CO <sub>2</sub> /kWh)	0.5 kg -CO <sub>2</sub> /kWh			
			Heat source	Heat pump capacity (1 - 40 kW)		11.2 kW		
				Boiler efficiency (25 - 150%)		80%		
				Booster heater 1 capacity (1 - 20 kW)		2 kW		
				Booster heater 2 capacity (1 - 20 kW)		4 kW		
		Floor dry up function	On/Off *4		Off			
			Target temp.	Start&Finish (25 - 60°C)	30°C			
				Max. temp. (25 - 60°C)	45°C			
				Max. temp. period (1 - 20 days)	5 days			
			Flow temp. (Increase)	Temp. increase step (+1 - +10°C)	+5°C			
Increase interval (1 - 7 days)	2 days							
Flow temp. (Decrease)	Temp. decrease step (-1 - -10°C)		-5°C					
	Decrease interval (1 - 7 days)	2 days						
External input settings	Demand control (IN4)	Heat source OFF/Boiler operation	Boiler operation					
	Outdoor thermostat (IN5)	Heater operation/Boiler operation	Boiler operation					

\*3 When Dip SW1-1 is set to OFF "WITHOUT Boiler" or SW2-6 is set to OFF "WITHOUT Mixing tank", neither Boiler nor Hybrid can be selected.

\*4 On: the function is active; Off: the function is inactive.

\*5 "\*" of "\*/kwh" represents currency unit (e.g. € or £ or the like)

## 8 Supplementary information

### Refrigerant collecting (pumpdown) for split model systems only

Refer to "Refrigerant collection" in the outdoor unit installation manual or service manual.

### Back-up operation of boiler

Heating operation is backed up by boiler.

For more details, refer to the installation manual of PAC-TH011HT-E.

#### <Installation & System set up>

1. Set Dip-SW 1-1 to ON "With boiler" and SW2-6 to ON "With Mixing tank".
2. Install the thermistors THWB1 (Flow temp.) and THWB2 (return temp.) \*1 on the boiler circuit.
3. Connect the output wire (OUT10: Boiler operation) to the input (room thermostat input) on the boiler. \*2
4. Install one of the following room temp. thermostats. \*3

- Wireless remote controller (option)
- Room temp. thermostat (field supply)
- Main controller (remote position)

\*1 The boiler temp. thermistor is an optional part.

\*2 OUT10 has no voltage across it.

\*3 Boiler heating is controlled on/off by the room temp. thermostat.

#### <Remote controller settings>

1. Go to Service menu > Heat source setting and choose "Boiler" or "Auto". \*3
2. Go to Service menu > Operation settings > Boiler settings to make detailed settings for "Auto" above .

\*3 The "Auto" automatically switches heat sources between Heat pump (and Electric heater) and boiler.

Installers: Please be sure to put your contact address/telephone number on  
this manual before handing it to the customer.



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